HELSINKI SCHOOL OF ECONOMICS (HSE)
Department of Accounting and Finance

MOTIVATIONS FOR SEASONED EQUITY OFFERINGS: MARKET TIMING OR REAL INVESTMENTS?

Evidence from a decomposition of market-to-book ratio

Finance
Master´s thesis
Juhani Laakso
Spring 2008

Approved by the Council of the Department 5 / 2 2008 and awarded the grade excellent, 90 p.

Tarkastajat:

KTT, Matti Kelohaju

KTT, Matti Suominen

HELSINKI SCHOOL OF ECONOMICS
Master's Thesis in Finance
Juhani Laakso

ABSTRACT
9.1.2008

MOTIVATIONS FOR SEASONED EQUITY OFFERINGS: MARKET TIMING OR REAL INVESTMENTS?

PURPOSE OF THE STUDY

This thesis examines the extent to which misvaluation and investment opportunities motivate equity issuance decisions and contribute to announcement abnormal returns and long-term abnormal returns by means of a decomposition of market-to-book ratio. Specifically, this thesis presents a decomposition of market-to-book ratio into misvaluation and investment opportunity components. Furthermore, these components are applied to the study of factors affecting the equity issuance behavior. This study attempts to shed light on determinants of issuance decision and issuance related abnormal returns by comparing issuing firms to non-issuers and analyzing issue size and usage of proceeds, and investigates the determinants of both short-term and long-term issue related abnormal returns. As a result, this thesis extends the existing literature by presenting a unique test of both market timing and real investment theories of financing decisions. In addition to unpublished working paper by Hertzel and Li (2007), this thesis is the first attempt to study equity issuance decisions by means of a decomposition of market-to-book ratio.

DATA

The core data on security offerings is obtained from Thomson Financial SDC Platinum database and consists of 2 193 seasoned equity offerings made by U.S. companies during the period from 1982 to 2006. The control sample consists of 85 753 firm-year observations that are not associated with equity offerings. Data on stock returns, accounting items, and analyst coverage is from Thomson Financial Datastream, Thomson Financial Worldscope, and Institutional Broker Estimate System database (I/B/E/S), respectively.

RESULTS

The findings of this thesis clearly show that both misvaluation and investment opportunities matter. Firm-specific error and long-term value-to-book that proxy for misvaluation and investment opportunities, respectively, affect positively the likelihood of equity issuance. Moreover, investment opportunities are positively related to the size of the offering, as well as to the post-issue capital expenditures and investments in research and development. On the other hand, misvaluation is significantly positively related to the long-term debt reductions and changes in liquid assets.

I find that long-term post-issue abnormal stock returns are more negative for issuers that are more overvalued. In contrast, the evidence suggests that the relation of investment opportunities to the post-issue abnormal performance is generally positive. Thus, it seems that firm-level misvaluation is the most important factor contributing to the observed low post-issue returns. In contrast, I fail to find any meaningful relations between the components of market-to-book ratio and the announcement abnormal returns.

KEYWORDS

Financing decisions, seasoned equity offerings, market timing, real investments

HELSINKI SCHOOL OF ECONOMICS
Rahoituksen Pro Gradu -tutkielma
Juhani Laakso

TIIVISTELMÄ
9.1.2008

PERUSTUUKO OSAKEANTIPÄÄTÖS MARKKINAN AJOITTAMISEEN VAI INVESTOINTIRAHOITUSTARPEESEEN?

TUTKIMUKSEN TARKOITUS

Tutkielman tarkoituksena on tutkia, miten markkinan ajoittaminen ja investointirahoitustarve vaikuttavat yritysten osakeantipäätöksiin sekä osaketuottoihin antipäätöksen julkistushetkellä sekä myöhemmin, pitkällä aikavälillä. Tutkimus perustuu oman pääoman markkina-arvon ja kirja-arvon suhteen, eli ns. market-to-book tunnusluvun, dekompositioon, jossa suhdeluku jaetaan markkinan virhearvostusta ja investointimahdollisuuksia kuvaaviin komponentteihin. Tutkielmän ensimmäisessä osassa käsitellään syitä osakeantipäätösten taustalla vertaamalla osakeantiyrityksiä muihin vastaaviin pörssiyhtiöihin sekä tutkimalla osakeannin kokoa ja annilla kerättyjen varojen käyttöä. Tutkielman toinen osa puolestaan keskittyy osakeanteihin liittyviin lyhyen ja pitkän aikavälin osaketuottoihin ja niitä selittäviin tekijöihin. Näin ollen tutkielma muodostaa ainutlaatuisen ja kattavan testin, jossa tarkastellaan samanaikaisesti markkinoiden ajoittamiseen ja investointien rahoitukseen perustuvien rahoituspäätöksiä selittävien teorioiden soveltuvuutta käytäntöön. Tämän Pro Gradu –tutkielman lisäksi ainoastaan Hetzel ja Li (2007) ovat vielä julkaisemattomassa työpaperissaan tutkineet rahoituspäätöksiä markkina-arvon ja kirja-arvon suhteen dekomposition avulla.

AINEISTO

Tässä tutkielmassa käytetyn aineiston keskeisen osan muodostaa 2 193 osakeantiin perustuva otos, joka on kerätty Thomson Financial SDC Platinum tietokannasta. Osakeannit on tehty Yhdysvalloissa vuosien 1982 ja 2006 välillä. Osaketuottoja, kirjanpidon eriä ja analyytikkoseurantaa kuvaava tieto on peräisin Thomson Financial Datastream, Thomson Financial Worldscope ja Institutional Broker Estimate System (I/B/E/S) tietokannoista.

TULOKSET

Tutkielman tulokset osoittavat kiistattomasti, että markkinan virhearvostus ja investointimahdollisuudet vaikuttavat osakeantien taustalla. Ensinnäkin markkinan yliarvostus kasvattaa osakeannin todennäköisyyttä. Samankaltainen vaikutus on myös investointimahdollisuuksilla. Lisäksi sekä yliarvostus että investointimahdollisuudet vaikuttavat positiivisesti osakeannin kokoon. Tosin tässä tapauksessa markkinan virhearvostusta kuvaavan komponentin vaikutus on melko heikko. Osakeannilla kerättyjen varojen tarkastelu puolestaan osoittaa, että investointimahdollisuuksien ja annin jälkeisten käyttöomaisuusinvestointien sekä tutkimus- ja kehitysmenojen suhde on positiivinen. Markkinan yliarvostus taas vaikuttaa positiivisesti pitkäaikaisen vieraan pääoman takaisinmaksuun ja likvidien varojen muutokseen. Lisäksi havaitaan, että pitkän aikavälin osaketuotot osakeannin jälkeen ovat pienempiä yliarvostettujen yritysten tapauksessa. Investointimahdollisuudet puolestaan kasvattavat pitkän aikavälin tuottoja. Siten markkinan ajoittaminen näyttää olevan keskeinen tekijä osakeantiyritysten heikon pitkän aikavälin tuottokehityksen taustalla.

AVAINSANAT

Rahoituspäätökset, osakeannit, markkinan ajoittaminen, investointien rahoitus

Table of contents

1 INTRODUCTION 1
1.1 BACKGROUND AND MOTIVATION 1
1.2 RESEARCH PROBLEM, OBJECTIVES AND CONTRIBUTION 3
1.3 MAIN RESULTS 6
1.4 STRUCTURE OF THE STUDY 6
2 LITERATURE REVIEW 7
2.1 TRADITIONAL THEORIES OF CAPITAL STRUCTURE AND FINANCING DECISIONS 7
2.1.1 Capital structure irrelevancy and trade-off theory 7
2.1.2 Pecking order theory of financing choices 9
2.2 STIMULATING EMPIRICAL EVIDENCE ON SEASONED EQUITY OFFERINGS 10
2.2.1 Announcement effect 11
2.2.2 Long-term post-issue performance 12
2.3 MARKET TIMING THEORY 15
2.3.1 Market timing and empirical evidence 16
2.3.2 Rational market timing 19
2.3.3 Beyond market timing 21
2.4 REAL INVESTMENT THEORY 21
2.5 ALTERNATIVE MODELS OF POOR LONG-TERM POST-ISSUE PERFORMANCE 24
2.5.1 Managerial entrenchment theory 24
2.5.2 Pseudo market timing 25
2.5.3 Model misspecification and long-term post-issue performance 26
3 HYPOTHESES 27
3.1 DETERMINANTS OF ISSUANCE DECISION 28
3.2 DETERMINANTS OF ABNORMAL RETURNS 29
4 DATA 31
4.1 OUTLINE OF THE SAMPLE 31
4.2 DATA COLLECTION PROCESS 32
4.3 DESCRIPTIVE STATISTICS 34
5 METHODOLOGY 37
5.1 OLS REGRESSION 37
5.2 LOGIT REGRESSIONS 38
5.3 HECKMAN SELECTION MODEL 40
5.4 SHORT-TERM ABNORMAL RETURNS 40
5.5 LONG-TERM ABNORMAL RETURNS 41
5.5.1 Buy-and-hold abnormal returns 42
5.5.2 Calendar-time abnormal returns 43
6 DECOMPOSITION OF MARKET-TO-BOOK RATIO 44
6.1 THEORETICAL BACKGROUND 45
6.2 ALTERNATIVE MODELS OF FUNDAMENTAL VALUE 47
6.3 DECOMPOSITION OF MARKET-TO-BOOK AND CONVENTIONAL FINANCIAL INDICATORS 50
7 EMPIRICAL RESULTS 53
7.1 DETERMINANTS OF ISSUANCE DECISION 53
7.1.1 Issuance activity and market-to-book components across time 53
7.1.2 Factors affecting the probability of seasoned equity offering 55
7.1.3 Size of equity issue 61
7.1.4 Usage of proceeds 67
7.1.5 Summary of findings on determinants of issuance decision 77
7.2 DETERMINANTS OF ABNORMAL RETURNS 79
7.2.1 Announcement effect 79
7.2.2 Long-term post-issue performance 86
7.2.3 Summary of findings on abnormal returns 96
8 CONCLUSIONS 97
REFERENCES 100

List of tables

Table 1: Evidence on announcement effect 11
Table 2: Evidence on post-issue buy-and-hold abnormal returns 13
Table 3: Evidence on post-issue calendar-time portfolio abnormal returns 14
Table 4: Summary of hypotheses 31
Table 5: Time-series average accounting multiples from fundamental value regressions 50
Table 6: Decomposition of market-to-book at firm-level 55
Table 7: Logit regression: Determinants of issuance decision 58
Table 8: Size of seasoned equity offering 61
Table 9: OLS regression: Determinants of issue size 63
Table 10: Heckman selection and multinomial logit regressions: Determinants of issue size 65
Table 11: Post-issue increases in expenditures and assets 69
Table 12: OLS regression: Usage of proceeds 73
Table 13: Pre-issue financial position and liquidity of firms issuing seasoned equity 75
Table 14: Disclosed usage of proceeds 76
Table 15: Summary of findings on determinants of issuance decision 78
Table 16: Cumulative abnormal returns around announcement of seasoned equity offering 82
Table 17: OLS regression: Determinants of abnormal announcement returns 83
Table 18: Post-issue buy-and-hold abnormal returns 88
Table 19: OLS regression: Determinants of buy-and-hold abnormal returns 90
Table 20: Calendar-time portfolio abnormal returns 93
Table 21: Summary of findings on determinants of abnormal returns 97

List of figures

Figure I: Pseudo market timing 25
Figure II: Distribution of seasoned equity offerings across time and industries 36
Figure III: Decomposition of market-to-book ratio and conventional financial indicators 51
Figure IV: Market-to-book components and seasoned equity offerings across time 54
Figure V: Distribution of issuer sample across market-to-book component quartiles 57
Figure VI: Average issue size across market-to-book component quartiles 62
Figure VII: Post-issue increases in expenditures and assets 71
Figure VIII: Abnormal returns around announcement of seasoned equity offering 80
Figure IX: Post-issue buy-and-hold abnormal returns 87

List of appendices

Appendix A1: Accounting multiples from fundamental value regression (Model 1) ..... A. 1
Appendix A2: Accounting multiples from fundamental value regression (Model 2) ..... A. 2
Appendix A3: Accounting multiples from fundamental value regression (Model 3) ..... A. 3

1 Introduction

1.1 Background and motivation

Seasoned equity offerings are a very visible and important activity in the life of a firm. Theoretically, seasoned equity offerings interconnect with all of the core areas in financial economics: asset pricing theory, capital structure theory, managerial investment incentives, financial institutions, and corporate governance. What is more, seasoned equity offerings have received a great deal of attention in the financial literature during the recent years. Mostly this is attributable to the relatively new and well-documented observation that seasoned equity issuers experience significant stock price run-ups in the year prior to the offering and perform poorly in the long run. As a result, new theoretical models of financing decisions have emerged. The empirical research on seasoned equity offerings has also been extensive. Furthermore, the economic significance of seasoned equity offerings is undeniable. According to Eckbo et al. (2007), the proceeds from seasoned equity offerings made by companies headquartered in the USA during the period from 1980 to 2003 totaled $ 959 billion. The total number of seasoned equity offerings was 11 151 and as a result, the average issue size amounts to $ 83 million. Compared to other types of securities, only public offerings of straight debt exceed the seasoned equity offerings in number. To conclude, a thorough understanding of the equity issuance behavior is important with respect to both financial theory and practical decision making and therefore, the importance of equity offerings cannot be overstated.

As seasoned equity offerings are large in size and important for the firm as a whole, it is easy to believe that the motives for these offerings are quite varied and complex in reality. The most common reason given for these actions is to raise capital for capital expenditures and new investment projects. Other reasons explored widely by both academics and practitioners include the opportunity to exploit private information about the intrinsic value of securities. In other words, if equity prices are higher than warranted by firms' fundamentals, then by issuing overvalued equity, firms can increase the value of existing shares at the expense of new shareholders. Therefore, there are at least two possible, not necessarily mutually exclusive, motivations for seasoned equity offerings: to finance investments and to transfer wealth from new shareholders to existing ones. The academic literature has not distinguished fully between these alternative explanations. In fact, there is surprisingly little consensus on the key

determinants of equity issuance decisions and their economic effects on the firm. In addition to the decades old traditional theories of capital structure and corporate financing, the modern literature focuses mainly on two competing models to explain the equity issuance behavior of firms. Market timing theory articulated by Baker and Wurgler (2002) states that misvaluation is the key driver of equity issuance. More recently, Zhang (2005) and Carlson et al. (2006) have proposed real investment based models of equity issuance decisions.

The market timing based explanation states that the pre-issue stock price run-up reflects the divergence of stock price from the fundamentals, that managers choose to issue equity when their firms are overvalued, and that the ex ante overvaluation is reversed only after several years resulting in poor long-term stock returns. Similarly, real investment theory is able to justify the observed return pattern. Carlson et al. (2006), for example, use a real options framework. They argue that the pre-issue run-up reflects investment options moving into the money, that managers issue equity to invest in these options, and that low post-issue returns reflect a decrease in firm risk as risky real options are converted into less risky assets in place. Besides the stock return pattern around equity offerings, also higher than average market-to-book ratios, as well as other measures of relative valuation, associated with firms issuing seasoned equity were once regarded as strong evidence in support of the market timing model. However, in addition to being a sign of overvaluation, high market-to-book might also act as an indicator of favorable investment opportunities, consistent with the real investment theory. As a result, the traditional market-to-book ratio is a somewhat problematic measure because of multiple and imprecise interpretations. By employing a novel methodology developed by Rhodes-Kropf et al. (2005) to decompose the market-to-book ratio into misvaluation and investment opportunity components, I am able to avoid the problem of multiple interpretations and discriminate between market timing and real investment based models of equity issuance. Specifically, I aim to apply misvaluation and investment opportunity components to various empirical experiments as explanatory variables. As a result, my thesis provides a set of rigorous tests between the market timing and real investment based explanations and evidence on the possibility that both models contribute to the observed phenomena of equity issuance.

Given its scope, master's thesis provides an excellent platform to study the implications of the market timing and real investment theories thoroughly. I am able to cover several topics, such as

determinants of issue size, usage of proceeds, announcement effect, and long-term abnormal performance of issuers. The full treatment of seasoned equity offerings prepares the way for fresh insights and reliable conclusions. Thus, I am confident that the end result is a richer understanding of the complexities of the equity issuance process.

1.2 Research problem, objectives and contribution

This thesis examines the extent to which misvaluation and investment opportunities motivate equity issuance decisions, and contribute to announcement returns and long-term abnormal returns. By doing this, the thesis employs a decomposition of market-to-book ratio. More specifically, I present a decomposition of market-to-book ratio into misvaluation and investment opportunity components. These components are applied to the study of factors affecting the equity issuance behavior to gain further insights about the effects of misvaluation and investment opportunities. Instead of the traditional market-to-book ratio, it is of great interest to examine the effects of market-to-book components on equity issuance. Firstly, I am able to overcome the problem of multiple interpretations. Namely, even if I was able to find significant relations between the market-to-book ratio and equity issuance behavior, I would not be able to judge whether the relations are actually attributable to misvaluation, investment opportunities, or perhaps the both. However, employing market-to-book components allows for a direct discrimination between these possible interpretations. Secondly, by being able to discriminate between the effects of misvaluation and investment opportunities on equity issuance, I present a direct and logical test of market timing and real investment theories.

To the best of my knowledge, in addition to unpublished working paper by Hertzel and Li (2007), this thesis is the first attempt to study security issuance decisions by means of decomposed market-to-book ratio. By employing a freshly minded methodology, I believe that this thesis contributes to existing research in numerous ways. I not only extend the work of Hertzel and Li (2007) by providing a more comprehensive picture on the areas covered in their research, but also present new subjects of research.

In the first part of their study, Hertzel and Li (2007) link the misvaluation and investment opportunity components of market-to-book with the subsequent firm-level operations. Specifically, they regress several accounting variables that are likely to capture the usage of

proceeds on market-to-book components while controlling for other possible determinants. According to Hertzel and Li (2007), this provides systematic evidence on the question about how the money raised in the offerings is used by the firms, which, in turn, unmasks the motives for issuing public equity in an intuitive manner. Basically, I reproduce Hertzel and Li's (2007) analysis of the usage of proceeds with certain differences. For example, in contrast to Hertzel and Li (2007), I examine non-high-tech and high-tech firms separately, and find relatively significant differences between the groups. Despite small differences in the experiments, the overall results are comparable to those of Hertzel and Li (2007). Generally, it seems that investment opportunities are positively related to the post-issue capital expenditures and investments in research and development, whereas misvaluation affects positively the long-term debt reductions and changes in liquid assets. However, what makes my analysis interesting is the fact that I take a step further from the setting of Hertzel and Li (2007). By examining pre-issue firm characteristics, I find that the post-issue increases in liquid assets and decreases in debt with overvalued firms are largely driven by corrections in poor pre-issue liquidity and financial position, not by managers' empire-building behavior. In addition, I investigate the firm-level disclosure about the usage of proceeds and find similar evidence to the accounting item based analysis.

In addition to usage of proceeds, Hertzel and Li (2007) study the effects of misvaluation and investment opportunities on long-term post-issue abnormal stock returns through calendar-time portfolios. I extend their analysis by introducing a more comprehensive set of portfolios and holding periods, and most importantly, presenting an alternative approach to measure long-term stock price performance, that is, buy-and-hold abnormal returns. I am confident that my thorough examination based on two alternative methodologies adds value, especially as the measurement of long-term abnormal performance is extremely treacherous as pointed out by, for example, Fama (1998) and Eckbo et al. (2000). Considering the results, this thesis confirms the finding of Hertzel and Li (2007) that firm-level misvaluation is the most important cause of equity issuers' poor long-term stock market performance. On the other hand, my results imply that investment opportunities are positively related to the long-term post-issue abnormal returns, which is clearly inconsistent with the real investment theory of Zhang (2005) and Carlson et al. (2006). Specially, buy-and-hold abnormal returns indicate that the positive relation is quite significant. In contrast,

Hertzel and Li (2007) do not find any statistically significant relations between post-issue abnormal returns and pre-issue investment opportunities.

Interestingly, this thesis covers also areas of equity issuance behavior that are not processed by Hertzel and Li (2007). In fact, to my knowledge, the other experiments presented in this thesis are completely unique. These novel analyses concentrate on the determinants of equity issuance decision, issue size, and announcement returns. Firstly, in attempt to shed light on the determinants of issuance decision, and specifically the effects of market timing and real investments, I compare the level of misvaluation and investment opportunity components of 2 193 firm-year observations associated with seasoned equity offerings to 85 753 control observations using univariate tests and multivariate logistic regressions. All these experiments show undoubtedly that both misvaluation and investment opportunities are positively related to the likelihood of equity issuance. Secondly, I investigate the relation between the size of equity offering and the pre-issue components of market-to-book ratio. By applying misvaluation and investment opportunity components to the analysis, I am able to test the theoretical models' distinct predictions about factors affecting the size of equity offering. I find that investment opportunities contribute to larger equity issues, whereas the effect of misvaluation on issue size is somewhat questionable. As a result, it seems that equity issuance activity is, at least partly, driven by future investments. Besides findings central to my research problem, the issue size analysis as a whole is interesting because the prior empirical literature examining the determinants of issue size is virtually nonexistent. Finally, I study the effects of misvaluation and investment opportunities on short-term abnormal returns around equity issue announcements. It is of great interest to investigate the announcement returns formally as the negative market reaction to issuance announcements is generally regarded as central evidence in support of both the market timing and real investment models. Yet, I do not find any meaningful and statistically significant results.

This thesis also adds to the understanding about the decomposition of market-to-book ratio. After the introduction by Rhodes-Kropf et al. (2005), all the subsequent studies have employed the methodology exactly as suggested by Rhodes-Kropf et al. (2005). This thesis makes an exception by being the first study to apply a more advanced industry classification. I argue that this improves the components' reliability as measures of misvaluation and investment opportunities.

A more precise industry classification is, for example, directly reflected in the improved goodness of fit in case of fundamental value regressions. In addition, I compare the misvaluation and investment opportunity components to traditional indicators of relative valuation and investment activity, respectively, in a novel manner.

1.3 Main results

The main finding of this thesis is clearly that both misvaluation and investment opportunities matter in terms of financing decisions. Misvaluation and investment opportunities affect positively the likelihood of seasoned equity offering, which is consistent with both the market timing and real investment theories of financing decisions. Moreover, investment opportunities are positively related to the size of the offering, as well as to the post-issue capital expenditures and investments in research and development. Especially the positive relation between investment opportunities and issue size is a novel observation. On the other hand, misvaluation is significantly positively related to the long-term debt reductions and changes in liquid assets, which bolsters the conclusion that equity offerings are at least partly motivated by misvaluation.

Consistent with the theory of market timing, I find that long-term post-issue abnormal stock returns are more negative for issuers that are more overvalued. In contrast, it seems that the relation of investment opportunities to the post-issue abnormal performance is generally positive. As a result, firm-level misvaluation seems to be the most important factor contributing to the low long-term post-issue returns. Considering the announcement returns, I fail to find any significant and meaningful relations between the components of market-to-book ratio and the magnitude of the market reaction to issuance announcements. However, consistent with the prior literature, I document a significant drop in stock price at the announcement.

1.4 Structure of the study

The remainder of this thesis is structured as follows. Chapter 2 provides a review of the most relevant theoretical and empirical research on the topic. Section 3 discusses and motivates the hypotheses. Chapter 4 describes the sample and data collection process, whereas Chapter 5 introduces the methodology. Chapter 6 presents the decomposition of market-to-book ratio. Chapter 7 provides the empirical results of the study. Finally, Chapter 8 concludes.

2 Literature review

This chapter reviews the relevant literature for my thesis. The first section discusses the traditional theories of capital structure and financing decisions. In addition, the section reviews the most important empirical evidence that promoted the theoretical development in the area of financing decisions. Then, the focus shifts on the most relevant theories in terms of this study, that is, models of market timing and real investment. Finally, I will review several novel explanations for equity issuance behavior and especially for the poor long-term performance of firms issuing seasoned equity.

2.1 Traditional theories of capital structure and financing decisions

The financial literature has traditionally focused on two competing models to explain the financing decisions of firms. In the trade-off model, firms identify optimal leverage by weighting the costs and benefits of an additional dollar of debt. An alternative theory, the pecking order model, arises from the assumption that transaction costs and costs of asymmetric information overwhelm the implications of the trade-off model. Despite logical theoretical argumentation and some supporting evidence, the real-life financing decisions seem to violate the central predictions of both models.

2.1.1 Capital structure irrelevancy and trade-off theory

Modigliani and Miller (1958) show in their celebrated study that capital structure is irrelevant in perfect and efficient capital markets. The core of their theory is based on the assumption that the expected rate of return on common stock of a levered firm increases in proportion to the debt-equity ratio. Furthermore, the increase in risk is exactly offset by the increase in shareholders' required rate of return. In addition, the firm is required to pay higher interest on debt. As a result, the costs of different forms of capital do not vary independently and therefore, there is no gain from opportunistically switching between equity and debt. As mentioned, propositions of Modigliani and Miller depend on perfect capital markets. Despite the fact that capital markets are generally well-functioning, they are not completely perfect all the time (e.g. Mackie-Mason (1990) and Fama and French (1998)). For example, taxation creates a significant capital market imperfection that challenges the propositions of Modigliani and Miller (1958).

According to Modigliani and Miller (1963), the target debt ratios may vary from firm to firm. They recognized that higher corporate income taxes indicate more debt, which was the trigger for the gradual development of the trade-off theory of capital structure. The trade-off theory determines an optimal capital structure by adding various market imperfections, such as taxes, costs of financial distress and agency costs, into the traditional model. The assumptions about market efficiency and symmetric information are, however, retained. These imperfections are expected to lead to an optimal trade-off. Some of the imperfections that affect the optimal trade-off are as follows. Miller and Scholes (1978) argue that higher taxes on dividends indicate more debt. Higher non-debt tax shields, on the other hand, indicate less debt (DeAngelo and Masulis (1980)). In addition to taxation, costs of financial distress are also considered as integral part of the trade-off theory. Higher costs of financial distress indicate more equity financing. For example, Myers (1977) shows that senior debt can force managers to reject profitable investment opportunities. In corporate finance, this phenomenon is widely known as debt overhand problem. The existence of debt removes the incentive to invest in positive NPV projects because benefits from successful investments go straight to debt holders in form of debt repayments. On the other hand, too much equity can lead to excessive free cash flows and therefore, conflicts of interest between managers and shareholders (Jensen (1986)).

The trade-off theory successfully explains many inter-industry differences in capital structure. Growth companies with risky and intangible assets are relatively mildly levered whereas safe and tangible assets result in substantial borrowing (e.g. Kester (1986)). The trade-off theory also helps explain what kind of companies become targets in leveraged buy-outs[1]. Target companies in these transactions are usually mature, cash-generating businesses. Based on the trade-off theory, this seems rational because exactly this kind of firms should be associated with high debt ratios (Opler and Titman (1993)).

Despite the supportive elements introduced above, wide-ranging empirical evidence is inconsistent with the predictions based on the trade-off model. Firstly, the trade-off theory cannot explain why some of the most successful companies thrive with little debt. Thereby, they seem to be giving up a valuable interest tax shield. For example, Kester (1986) reports that in Japan and United States, high profitability was the most statistically significant variable distinguishing low-

[1] Leveraged buy-outs (LBO) are acquisitions of public companies by private investors who finance a large fraction of the purchase with risky debt.

from high-debt companies. In addition, Mackie-Mason (1990) shows that public companies rarely make major shifts in capital structure because of taxes. Furthermore, Fama and French (1998) failed to find any evidence about the impact of tax shield on firm value. Similarly, Lee (1997), Shyam-Sunder and Myers (1999), Baker and Wurgler (2002), and Cai and Ghosh (2004) conclude that a considerable fraction of variation in leverage has nothing to do with an optimum set by current characteristics, such as taxes or agency costs. As a conclusion, Shyam-Sunder and Myers (1999) claim that the trade-off model can be completely rejected.

2.1.2 Pecking order theory of financing choices

In addition to the trade-off theory, the pecking order theory has historically been one of the most influential theories of corporate financing. In contrast to the trade-off theory, there is no optimal capital structure in the pecking order theory described by Myers (1984). Or to be more precise, there might be an optimum, but the cost of deviating from it is insignificant in comparison to the cost of raising external financing. The pecking order theory is based on asymmetric information which indicates that managers know more about their firms' prospects, risks and values than do outside investors. Moreover, as Myers and Majluf (1984) point out, outside investors are well aware of this information asymmetry. If investors are assumed to be rational, they discount the firm's stock price when managers issue equity instead of debt. As a result, managers avoid issuing equity because of this expected consequent discount. This leads to a pecking order, in which investments are financed first with internal funds, then by new issue of debt and finally, with new issue of equity. Moreover, Myers and Majluf (1984) predict that in the absence of investment opportunities, firms retain profits and build up financial slack to avoid having to raise external financing in the future.

Considering the capital structure, pecking order theory is able to explain why the most profitable firms generally borrow less (e.g. Fama and French (2002) and Shyam-Sunder and Myers (1999)). In addition, Titman and Wessels (1988) show evidence supporting the importance of transaction costs as a determinant of capital structure. However, the pecking order is less successful in explaining several other observed phenomena. Myers (1984) and Fama and French (2002) note that periods of high investment opportunities should push leverage higher toward a debt capacity according to pecking order theory. As a result, if it is assumed that market-to-book ratio and investment opportunities have a certain positive relation, high market-to-book ratio should lead to

increased leverage. As a clear contradiction, in addition to Fama and French (2002), also Baker and Wurgler (2002) and Rajan and Zingales (1995) report that periods of high market-to-book ratio tend to push leverage lower. The evidence of Rajan and Zingales (1995) is especially telling because of outstandingly large sample consisting of all former G-7[2] countries.

What comes to financing decisions, Helwege and Liang (1996) and Frank and Goyal (2003) found that firms that could have obtained bank loans often choose to issue equity instead. Furthermore, Fama and French (2002) note that least-levered firms make the largest net issues of equity. These are clear contradictions with the traditional pecking order theory. As pecking order theory regards equity as a financing of last resort, the most striking evidence against the theory is clearly the plentitude of equity transactions. Fama and French (2005) report that 86 % of firms issue some equity[3] each year during 1993 to 2002. Moreover, during the same period, the average size of equity issue is 12.6 % of total assets while the average size of debt issue stands at 6.4 %. Huang and Song (2006) report that the external equity is the most important source of financing for Chinese listed companies. As authors themselves note, this pattern seems as reverse pecking order. Considering the wide-ranging evidence, the following statement of Fama and French (2005) seems justified: "The pecking order, as the stand-alone model of capital structure proposed by Myers (1984), is dead: financing with equity is not a last resort, and asymmetric information problems are not the sole (or perhaps even an important) determinants of capital structure."

2.2 Stimulating empirical evidence on seasoned equity offerings

The discoveries of stock price run-ups prior to equity issues and negative announcement returns in the mid-1980s, and weak long-tem post-issue stock return performance in the mid-1990s stimulated the research around security offerings and capital structure. These discoveries were hard to understand within the traditional trade-off model. Similarly, the pecking order model is unable to explain the poor post-issue long-term stock return performance. Thus, the modern models of equity issuance evolved gradually to explain the empirically documented stock return pattern. As a result, the negative announcement effect and poor long-term post-issue performance

[2] The G-7 countries are regarded as the world's leading financial nations. The group consists of United Kingdom, Canada, France, Germany, Italy, Japan and United States. After the joining of Russia in 1997, the group is known as G-8.

[3] In addition to seasoned equity offerings, Fama and French (2005) regard equity-financed mergers and acquisitions, private placements, convertible debt issues, warrants, direct purchase plans, rights issues, employee options, grants and benefit plans as equity transactions.

are the most important empirical cornerstones of market timing and real investment models. It is therefore of great interest to summarize the extensive empirical evidence related to the announcement effect and long-term post-issue performance. In addition, this section adds value to my thesis by providing a point of comparison for the results presented later on.

2.2.1 Announcement effect

In addition to long-term post-issue performance, the announcement effect is the most studied aspect of seasoned equity offerings. Therefore, the evidence is notably extensive and solid. Table 1 introduces the most important papers about the announcement effect of seasoned equity offerings. The results shown in Table 1 are all based on conventional event study approach[4].

Table 1: Evidence on announcement effect

The table reports the average market reaction to announcement of seasoned equity offerings by U.S. firms. The papers presented in the table are published during the period from 1986 to 2005. Cumulative abnormal returns are measured for the two-day event window, that is, [-1 , 0]. Studies that employ other event windows are clearly indicated. For each variable of interest, ***, **, and * indicate that the estimate is statistically significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

Study	Issuer type	Sample size	Sample period	Cumulative abnormal returns (%)	
Asquith and Mullins (1986)	All	392	1963-1981	-1.60 %***	
Masulis and Korwar (1986)	All	972	1963-1980	-1.85 %***	
Mikkelson and Partch (1986)	All	80	1972-1982	-3.56 %***	
Kalay and Shimrat (1987)	All	455	1970-1982	-3.36 %***	
Korajczyk et al. (1990)	All	1 285	1974-1983	-2.94 %***	
Hansen and Crutchley (1990)	All	109	1975-1982	-3.65 %***	
Denis (1991)	All	40	1982-1986	-1.00 %***	a
Eckbo and Masulis (1992)	All	1 057	1963-1981	-2.00 %***	
Eckbo and Masulis (1992)	All	53	1963-1981	-0.59 %	b
Jegadeesh et al. (1993)	All	411	1980-1989	-1.16 %***	c
Slovin et al. (1994)	All	175	1973-1988	-2.87 %***	c
Denis (1994)	All	435	1977-1990	-2.49 %***	
Bayless and Chaplinsky (1996)	All	1 884	1968-1990	-2.30 %***	d
Altinkilic and Hansen (2003)	All	1 703	1990-1997	-2.23 %***	
Bethel and Krigman (2004)	All	2 592	1992-2001	-2.01 %***	d
Bethel and Krigman (2004)	All	391	1992-2001	-1.27 %***	a,d
Heron and Lie (2004)	All	3 658	1980-1998	-2.50 %***	
Heron and Lie (2004)	All	256	1980-1998	-1.30 %***	a
Heron and Lie (2004)	All	56	1980-1998	-1.10 %	b
D'Mello et al. (2005)	All	1 621	1982-1995	-1.87 %***	d

a Seasoned equity offering is based on earlier shelf registration
b Rights offer as flotation method
c Sample is restricted to the first issuance following the initial public offering
d A three-day even window [-1 , +1] is employed

The results presented in Table 1 highlight the unambiguous finding that the market reaction to seasoned equity offerings is generally negative and strongly statistically significant. Overall, over the period of 1963-2001, the sample-weighted average announcement effect is approximately

[4] See Chapter *5.4 Short-term abnormal returns* for detailed information.

-2.2 %. Denis (1991), Bethel and Krigman (2004) and Heron and Lie (2004) study shelf-registration method[5] and report that despite the registration in advance, the issuing firms experience a significantly negative market reaction at the actual offering announcement. However, the announcement effect seems to be somewhat smaller. Moore et al. (1986) and Bethel and Krigman (2004) suggest that this is obvious because of a significant negative price reaction already at the shelf registration day. Eckbo and Masulis (1992) and Heron and Lie (2004) show that the announcement effect of rights offerings[6] is smaller and statistically insignificant. However, the credibility of their results suffers from relatively small sample size.

Barclay and Litzenberger (1988) complete the evidence based on traditional event study methodology by examining intraday transaction prices and exact announcement times. According to them, this approach allows them to make more powerful estimation of the market reaction to the announcement of seasoned equity offering. Barclay and Litzenberger (1998) report that there is a statistically significant negative abnormal return during the hour before the first public announcement. This might be a signal of insider trading. After the announcement, stock prices fall 1.3 % and 2.4 % during the post-announcement periods of 15 minutes and three hours, respectively.

Finally, all the studies related to regular public offerings of equity report a statistically significant positive pre-announcement period abnormal return. The length of the pre-announcement period under review is typically between 40 and 100 days. The 40-day average pre-announcement cumulative abnormal return varies across the studies considerably but, on average, ranges between 5 % and 10 %.

2.2.2 Long-term post-issue performance

To some researchers, the poor long-term performance of equity issuers challenges the efficient market hypothesis and motivates the development of behavioral asset pricing models. On the other hand, some scholars argue that the underperformance of issuers is mostly a fallacy attributable to defective statistical models that are used to measure long-term abnormal returns. Thus, the proper interpretation of the low long-term returns following seasoned equity offerings

[5] Shelf issue is a flotation method that allows financially strong public companies to register to sell up to a certain number of shares over the next two years using a list of possible underwriters. During the two-year period, the registration allows the sale of one or more equity issues.
[6] Rights offers are based on short lived in-the-money warrants to buy a fixed number of new shares at fixed price. These warrants, called as rights, are distributed to existing shareholders on a pro rata basis. The rights can often be resold to other investors or exercised before the expiration.

remains an unsettled issue (Eckbo et al. (2007)). Given the importance of long-term performance, the literature in this area is particularly comprehensive.

Table 2 reviews the most important empirical evidence presented to this day using the buy-and-hold abnormal returns[7] as a performance measure. The technique involves buying the issuing firm's stock in the month following the issue, and holding the stock for a certain period. Abnormal return is then calculated by deducting the realized return of a non-issuing firm or benchmark index from the return of issuer.

Table 2: Evidence on post-issue buy-and-hold abnormal returns

The table reports the average post-issue buy-and-hold abnormal returns for U.S. firms issuing seasoned equity. The papers presented in the table are published during the period from 1995 to 2007. Abnormal returns are measured for the period of three or five years, and the benchmark returns are based on size- and book-to-market matched control firms unless stated otherwise. For each variable of interest, ***, **, and * indicate that the estimate is statistically significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

Study	Issuer type	Sample size	Sample period	Holding period	Buy-and-hold abnormal returns (%)	
Loughran and Ritter (1995)	All	3 702	1970-1990	3 years	-33.00 %***	a
Loughran and Ritter (1995)	All	3 702	1970-1990	5 years	-59.40 %***	a
Spiess and Affleck-Graves (1995)	All	1 247	1975-1989	3 years	-22.80 %***	b
Lee (1997)	All	1 513	1976-1990	3 years	-20.30 %***	
Jegadeesh (2000)	All	2 992	1970-1993	5 years	-34.30 %***	
Brav et al. (2000)	All	3 775	1975-1992	5 years	-26.30 %***	
Eckbo et al. (2000)	Industrial	3 851	1964-1995	5 years	-23.20 %***	
Kahle (2000)	Industrial	1 739	1981-1992	3 years	-14.70 %***	
Clarke et al. (2001)	All	3 092	1984-1996	3 years	-14.30 %***	
Eckbo et al. (2007)	Industrial	4 971	1980-2000	5 years	-29.70 %***	
Eckbo et al. (2007)	Industrial	4 971	1980-2000	5 years	-26.00 %**	c
Eckbo et al. (2007)	Financial	655	1980-2000	5 years	0.00 %	
Eckbo et al. (2007)	Financial	655	1980-2000	5 years	2.30 %	c
Eckbo et al. (2007)	Utilities	659	1980-2000	5 years	-19.10 %**	
Eckbo et al. (2007)	Utilities	659	1980-2000	5 years	-32.30 %***	c

a Benchmark returns are based on size matched control firms
b All issues including secondary shares are excluded
c Value-weighted buy-and-hold abnormal returns

The studies with the largest samples are Loughran and Ritter (1995), Brav et al. (2000), Eckbo et al. (2000), Clarke et al. (2001) and Eckbo et al. (2007). These papers show evidence of significantly negative abnormal returns over a period of three or five years, ranging from -14.3 % to -59.4 %. Except for Loughran and Ritter (1995), the presented results are controlled for the effects of firm size and market-to-book ratio. In general, the findings shown in Table 2 are established using relatively similar data sources and methods. There are only a few exceptions. Spiess and Affleck-Graves (1995) have excluded all issues including secondary shares[8] from

[7] See Chapter *5.5.1 Buy-and-hold abnormal returns* for detailed information.

[8] In contrast to primary shares, secondary shares refer to existing shares of common stock that are sold to investors in an offering. Secondary shares are already registered and therefore, the number of shares outstanding does not increase in these secondary transactions. The selling shareholder receives the proceeds from the sale, rather than the firm.

their sample. They argue that this eliminates the effect of insiders' self-seeking from the results. The evidence on financial firms' issuance by Eckbo et al. (2007) makes quite an exceptional case. It seems that financial institutions issuing equity tend to outperform the benchmarks. The result might be partly attributable to the fact that a considerable proportion of these issues are involuntary as firms are forced to issue equity because of capital regulation.

Based on the criticism related to the measurement of long-term abnormal returns (e.g. Fama (1998) and Eckbo et al. (2000)), recent empirical papers have employed calendar-time portfolio approach[9] as measure of long-term performance. The methodology is based on portfolios constructed comprising all firms that have made seasoned equity offering within the last three or five years. The resulting time series of monthly excess returns on this portfolio is regressed on certain asset pricing model. The constant term of regression is used as a measure of the average monthly abnormal return on the portfolio. Table 3 shows the calendar-time portfolio based monthly abnormal returns reported in the literature.

Table 3: Evidence on post-issue calendar-time portfolio abnormal returns

The table reports the average monthly abnormal equal-weighted portfolio returns for U.S. firms issuing seasoned equity. The papers presented in the table are published during the period from 2000 to 2007. Abnormal returns are measured for the period of three or five years. Specifically, α is an estimate of the constant term resulting from regressing the excess return of a portfolio of issuing firms on a set of pricing factors in an empirical asset pricing model. The issuer's stock typically enters the portfolio in the month following the issue month. For each variable of interest, ***, **, and * indicate that the estimate is statistically significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

Study	Issuer type	Sample size	Sample period	Holding period	Regression model	α (%)
Jegadeesh (2000)	All	2 992	1970-1993	5 years	FF 3-factor	-0.31 %***
Brav et al. (2000)	All	3 775	1975-1992	5 years	FF 3-factor	-0.19 %*
Eckbo et al. (2000)	Industrial	3 315	1964-1995	5 years	FF 3-factor + macroeconomic factors	-0.05 %
Eckbo et al. (2000)	Industrial	3 315	1964-1995	5 years	FF 3-factor	-0.14 %*
Eckbo et al. (2000)	Utilities	880	1964-1995	5 years	FF 3-factor + macroeconomic factors	-0.13 %*
Bayless and Jay (2003)	Industrial	1 239	1971-1995	5 years	FF 3-factor	-0.54 %***
Krishnamurthy et al. (2005)	All	1 477	1983-1992	3 years	FF 3-factor	-0.36 %***
Eckbo and Norli (2005)	Industrial	1 704	1964-1995	5 years	Carhart 4-factor + liquidity factor	-0.03 %*
Lyandres et al. (2005)	All	6 122	1970-2003	3 years	Carhart 4-factor + investment factor	0.02 %*
D'Mello et al. (2005	All	1 621	1982-1995	3 years	FF 3-factor	-0.31 %***
Eckbo et al. (2007)	Industrial	5 127	1980-2000	5 years	FF 3-factor	-0.18 %*
Eckbo et al. (2007)	Industrial	5 127	1980-2000	5 years	Carhart 4-factor + liquidity factor	0.18 %
Eckbo et al. (2007)	Financial	878	1980-2000	5 years	FF 3-factor	-0.16 %
Eckbo et al. (2007)	Financial	878	1980-2000	5 years	Carhart 4-factor + liquidity factor	-0.09 %
Eckbo et al. (2007)	Utilities	693	1980-2000	5 years	FF 3-factor	0.06 %
Eckbo et al. (2007)	Utilities	693	1980-2000	5 years	Carhart 4-factor + liquidity factor	-0.08 %

Fama-French (FF) three-factor model includes excess return on market index, as well as size and book-to-market factors
Carhart four-factor model includes excess return on market index, as well as size, book-to-market, and momentum factors

On average, the monthly abnormal returns are negative. However, only a few papers document strong statistical significance. Moreover, studies employing the Fama-French (1993) three-factor

[9] See Chapter *5.5.2 Calendar-time abnormal returns* for detailed information.

model tend to produce larger abnormal returns than extended models. Therefore, despite the fact that the evidence as a whole strongly suggests that equity issuers underperform in the long run, the null hypothesis of no abnormal post-issue performance cannot be rejected completely without reserves.

The research of Jegadeesh (2000) is perhaps the most extensive of all large-sample studies. He employs both buy-and-hold and calendar-time abnormal returns to measure the long-term performance and concludes that the concept of long-term negative abnormal performance is robust. Convincingly, Jegadeesh (2000) employs equal-weighted and value-weighted market indices, portfolios constructed on firm-specific characteristics, and factor models as performance benchmarks. Similarly, Brav et al. (2000) employ both buy-and-hold and calendar-time abnormal returns in their study, and report significant underperformance of equity issuers. In addition, they argue that buy-and-hold returns magnify the underperformance and as a result, the results from calendar-time portfolio regressions are more reliable.

2.3 Market timing theory

The market timing theory proposed by Baker and Wurgler (2002) states that the capital structure is a cumulative outcome of managers' past attempts to time the equity market. Considering the equity issuance behavior, the theory predicts that firms issue equity when market values are high and repurchase equity during periods of low market valuation. What comes to the discussed empirical evidence, market timing based explanations state that the pre-issue stock price run-up reflects the divergence of stock price from the fundamentals, and that managers exploit new investors by issuing overvalued equity. The overvaluation is then reversed only after several years resulting in poor long-term stock returns.

The best-known version of market timing involves irrational behavior of investors or managers, at least temporarily. Time-varying mispricing or perceptions of mispricing are central elements of this behavioral equity market timing. Baker and Wurgler (2002) summarize that managers issue equity when they believe its cost is irrationally low and repurchase equity when they believe its cost is irrationally high. Chang et al. (2006) argue that behavioral market timing requires two essential ingredients. Firstly, the information sets of managers and investors concerning the value of the firm must be somewhat different, that is, managers have to believe that they are able to

recognize when stock prices have diverged from the fundamental value. Secondly, equity markets have to underreact to equity issuance announcement and as a result, the misvaluation perceived by the managers is not immediately corrected. It is important to keep in mind that behavioral market timing does not require the market to actually be inefficient. As Baker and Wurgler (2002) note, the critical assumption is simply that managers believe that they can time the market. On the other hand, if the discussed two conditions hold and managers are indeed correct on average, timing behavior can create value for firms' long-term shareholders.

2.3.1 Market timing and empirical evidence

In addition to the introduced negative announcement effect and weak long-term post-issue performance, a range of supplementary evidence indicates that the behavioral market timing is an important aspect of financing decisions. To be precise, four different kinds of studies provide evidence about the effect of market conditions on financing decisions. Firstly, it seems that firms tend to issue equity instead of debt when market value is high relative to both book value and past market values. Secondly, there is some evidence of earnings management concentrating around the equity offering and on the tendency to issue equity at times when investors are enthusiastic about earnings prospects (e.g. Loughran and Ritter (1997)). Thirdly, according to the survey of Graham and Harvey (2001), a vast majority of managers agree that the amount by which the stock is undervalued or overvalued is an important consideration in issuing equity. Moreover, the evidence on managerial decision making is further added up by observations of insider trading. Finally, there are certain very interesting specialized studies on long-term post-issue performance that bolster the impact of behavioral market timing.

Overall, equity issuance seems to be positively associated with plausible ex ante indicators of overvaluation (Ang and Cheng (2006)). Elliott et al. (2007) implement an earnings-based fundamental valuation model[10] that employs both actual future earnings and analysts' consensus earnings forecasts to test the impact of market timing on financing decisions. They find a strong positive relation between the misvaluation measure and the proportion of the firm's financing

[10] Specifically, Elliott et al. (2007) employ residual income based valuation approach. Residual income model based on ex post earnings equates the fundamental value to the sum of three-year stream of discounted actual abnormal earnings and the book value of equity. Similarly, residual income model based on ex ante analyst estimates equates the fundamental value to the sum of discounted estimates of abnormal earnings for the three-year period and the book value of equity. Residual income based relative valuation is the market value divided by the corresponding fundamental value.

deficit[11] that is funded with equity. Chang et al. (2006) report also that the probability of seasoned equity offering is positively related to market-to-book ratio. Similarly, Hovakimian et al. (2001) show that the likelihood of seasoned equity offering increases with market-to-book ratio and excess stock returns for the past two years. Jung et al. (1996) provide also almost identical results by showing that market-to-book ratio and past 11-month cumulative excess stock returns are positively related to the likelihood of seasoned equity offerings. However, DeAngelo et al. (2007) agree on the strong statistical significance of prior findings but question the economic significance of relative valuation as a determinant of equity issuance. They suggest that even radical variations in indicators of relative valuation do not have an economically important impact on the probability of seasoned equity offering.

Teoh et al. (1998) study earnings management around equity issues, concentrating particularly on discretionary accruals[12]. Their idea is that if investors are overly optimistic about the firm's prospects, they would be willing to buy more shares and pay higher prices for them. Therefore, issuing firms have a strong incentive to cultivate this optimism by reporting inflated earnings. In addition to Teoh et al. (1998), also Rangan (1998) and Shivakumar (1999) report evidence of earnings management prior to seasoned equity offerings. Teoh et al. (1998) and Rangan (1998) show also that although operating cash flows, on average, decline before equity issues, the reported discretionary accruals cause earnings to peak around the offer dates. Furthermore, the amount of discretionary accruals prior to the seasoned equity offering seems to be negatively related to the post-issue long-term stock return performance. The authors view this as evidence in favor of behavioral market timing and overly optimistic investors. Loughran and Ritter (1997) report supporting evidence by showing that firms' operating performance peaks in the year of equity offering. They argue that this causes investors to make exceptional forecast errors regarding the future profitability of the firm by naively extrapolating the strong pre-issue earnings performance to the future. Moreover, according to their evidence, managers seem to be able to take advantage of this enthusiasm. Denis and Sarin (2001) build up on the arguments of Loghran and Ritter (1997). They argue that if managers are timing equity issues and investors are systematically overly enthusiastic about issuers' future prospects, we should expect to see that

[11] Frank and Goyal (2003) define financing deficit as the sum of cash dividends, net investments and change in working capital, less cash flow after interest and taxes during the fiscal year.

[12] Under accruals accounting, income is reported when earned and expenses when incurred. Accruals originate when income is due but not received, or cost is incurred but not paid. In contrast to non-discretionary accruals, managers are able to influence on the amount of discretionary accruals.

investors are disappointed when firms convey their post-issue earnings. This is exactly what they found. Earnings announcements after seasoned equity offerings are met with a statistically significant negative abnormal stock price reaction. However, at the same time, Brous et al. (2001) reported similar signs but fail to find statistically significant abnormal price reactions.

Perhaps the most convincing evidence in support of behavioral market timing is the fact that managers admit to market timing in anonymous surveys. Graham and Harvey (2001) found that two-thirds of CFOs[13] agree that the amount by which the stock is undervalued or overvalued is an important or very important consideration in issuing equity. In that survey as a whole, market prices were regarded as more important than nine out of ten other factors considered in the decision to issue common stock. Jenter (2005) provides further evidence on managerial decision-making and market timing by examining insider trading and managers' private portfolio decisions. According to his evidence, managers' perceptions of fundamental value diverge systematically from market valuations, and the perceived mispricing seems to be an important determinant of individual managers' decision-making. Moreover, managers' private portfolio decisions are related to changes in corporate capital structure. Jenter (2005) argues that this is attributable to the fact that managers try to actively time the market both in their private trades and in firm-level decisions.

Finally, despite the existence of several competing theories of equity issuers' poor long-term stock returns, certain specialized studies in this area provide a distinctive support to the theory of behavioral market timing. Cornett et al. (1998) study voluntary and involuntary seasoned equity offerings by commercial banks. Capital regulations in the banking industry state that banks are not allowed to have total capital ratios[14] below a certain level. If the total capital ratio falls below the regulated lower bound, a bank may need to issue new equity to raise the capital ratio. Cornett et al. (1998) define an involuntary seasoned equity offering as an issue by a bank with capital ratio close to or below the required minimum ratio. If behavioral market timing is driving the long-term underperformance of issuers, we should expect to see less or no underperformance for involuntary issues. Their results are consistent with this idea, showing no abnormal three-year post-issue stock return performance for the involuntary issues, while the voluntary issues that are

[13] CFO is a shorthand for chief financial officer. In general, chief financial officer is responsible for financial planning and communicating the financial performance internally and in public.
[14] Capital ratio is a well-known measure of financial institutions' capital strength used by U.S. regulatory agencies.

affected by managerial discretion show statistically significant underperformance. Similarly, Hertzel and Li (2007) report that the long-term performance of firms issuing seasoned equity is negatively related to the pre-issue misvaluation component of market-to-book ratio. At the same time, they fail to find any statistically significant relation between the long-term performance and other components of market-to-book ratio. Clarke et al. (2001), on the other hand, study cancelled issues in addition to completed ones. Cancelled offerings are associated with significant negative returns between the announcement and cancellation. After the cancellation, firms underperform only slightly. Clarke et al. (2001) suggest that this evidence is consistent with managers trying to issue overvalued equity and abandoning the issuance plans if the favorable mispricing ceases to exist.

2.3.2 Rational market timing

In addition to the behavioral version of market timing involving irrational behavior of investors or managers, there is another version of equity market timing that is based on the assumption that both, managers and investors, are rational. Lucas and MacDonald (1990) introduce a rational model[15] that allows the adverse selection costs to vary across firms. Similarly, Choe et al. (1993) present a model allowing for time-varying adverse selection costs. According to the models, managers rationally time the equity issues to periods when adverse selection costs are lower.

Lucas and MacDonald (1990) and Eckbo and Masulis (1992) describe the adverse selection problem related to equity issues with the following train of thought. Firms face investment opportunities, and to finance them, make a choice between debt and equity. If costs associated with debt and equity issues are larger than the benefits from investment, less profitable investments are postponed or completely dismissed. Undervalued firms face dilution costs from selling undervalued equity. They will only issue equity when the dilution cost is less than or equal to the debt issuance cost. Therefore, if a firm issues equity, then the market knows that the equity was not substantially underpriced. If the equity was considerably underpriced, the firm would have issued debt or dismissed the investment. Thus, as a result of asymmetric information between managers and outside investors, equity issue announcement is greeted with a negative stock price reaction. The key insight of Lucas and MacDonald (1990) and Eckbo and Masulis (1992) is that if we allow for the possibility that the degree of information asymmetry,

[15] In most studies, the model of Lucas and MacDonald (1990) is known as the dynamic pecking order.

profitability of investments and equity valuation are dynamic, the adverse selection costs are bound to vary across firms and across time. This, in turn, enables rational market timing.

The empirical evidence supporting distinctly the rational version of market timing is somewhat thin. Korajczyk et al. (1991) found that firms tend to announce equity issues following releases of information, especially after quarterly and annual financial reports. Schwert (1989) and Bayless and Chaplinsky (1996) report similar clustering of equity issues in periods associated with less asymmetric information. In addition, Eckbo and Masulis (1992) show that the negative market reaction to the announcement of uninsured rights offerings is negligible, in contrast to firm commitment offer[16] announcements associated with considerable stock price dips. The authors interpret the result as evidence that the adverse selection costs vary across flotation methods, as well. They argue that the adverse selection costs become smaller the larger the proportion of issued shares is purchased by current shareholders.

Partially, the evidence on market timing does not directly discriminate between the rational and behavioral versions (Baker and Wurgler (2002) and Elliott et al. (2007)). This is especially true if we accept the possibility that measures of relative valuation and stock returns reflect, at least partly, the temporary fluctuations in adverse selection costs. Thereby, the well-documented positive relation between several measures of relative valuation and the likelihood of seasoned equity offerings, as well as the negative announcement effect and weak long-term post-issue performance, can be explained by both rational and behavioral models of market timing. However, according to Baker and Wurgler (2002), the evidence on earnings management, investor overoptimism, and managerial decision making makes a strong case for the behavioral view. Similarly, evidence based on specialized long-term abnormal return experiments provides a distinct support to the behavioral version. All in all, it seems that the explanatory power of the behavioral market timing involving temporarily irrational agents over real-life phenomena is considerably better relative to the rational view. Still, it is hard to rule out completely the possibility that the rational model completes the general view on financing decisions.

[16] Firm commitment flotation means that an underwriter contractually commits to purchase an entire security issue at a fixed price discount from the public offering price. All shares are sold to the public at the same price and the underwriter generally has the power to allocate the issue if there is excess demand. This process may involve book building or a fixed price placing.

2.3.3 Beyond market timing

Dittmar and Thakor (2007) and Alti and Sulaeman (2007) take one step further in the analysis of motivations behind seasoned equity offering. They acknowledge the existence of market timing as a primary determinant of financing decisions and examine the specific conditions when favorable equity valuation triggers a seasoned equity offering. Their studies are based on the observation that a significant proportion of firms associated with considerably high valuation levels do not issue equity. Dittmar and Thakor (2007) suggest that a firm will issue equity when its stock price is high and when outside investors have a high propensity to agree with managerial decisions. They use several different proxies for the agreement between managers and outside investors. Based on their evidence, Dittmar and Thakor (2007) argue that besides primary market timing, anticipated shareholder endorsement of corporate decisions is an important driver of equity issuance. Alti and Sulaeman (2007) found that firms issue seasoned equity only if high stock valuation coincides with strong demand from institutional investors. Based on their findings, the authors suggest that the opinion of influential investors about firm's stock price is a very important factor for managers in deciding whether to issue overvalued equity or not.

2.4 Real investment theory

Specially the fact that the behavioral market timing is based on the assumption of temporarily irrational agents has set up broadly-based criticism. Moreover, if we believe that managers are indeed able to create value by timing the equity issues, the markets are bound to provide the firms with windows of opportunity when the prices do not reflect the fundamentals. However, the real investment theory articulated by Carlson et al. (2006) and Zhang (2005) makes a clear exception because of its ability to explain the observed pattern of abnormal returns around the equity issues in the efficient market framework. Moreover, it is perhaps the only comprehensive theory of financing decisions that has evolved during the last years. As a result, it has received plenty of attention.

Carlson et al. (2005) remark that it is commonly, and most often mistakenly, assumed that investments in risky projects will increase asset risk which, in turn, should be reflected in higher rates of return. Moreover, Lyandres et al. (2005) document that investments-to-assets ratios of equity issuers are about twice as large as with non-issuing firms. Taken these together, it seems

very odd that issuers experience poor stock return performance in the long run compared to similar non-issuing firms.

However, according to the consequential insight of Carlson et al. (2006), lower equity returns follow equity offerings naturally when risky projects are viewed as real options on the cash flows potentially generated by the project. When project execution is flexible in time, the project becomes a real option. As a result, managers are able to time the starting of the project to maximize the value of the firm. According to Eckbo et al. (2007), an option to grow the company through execution of the project is a levered claim. Obviously, the required return on a levered claim is higher than the required return on an unlevered claim on the same assets. Exercising the real option, that is, making the investment necessary to start the project, unlevers the claim. Therefore, when firms grow they convert real options into assets in place. The assets may be risky, but options on these assets are even riskier. And finally, as we know, real options are only exercised when they move sufficiently in-the-money. By compiling the argumentation above, Carlson et al. (2006) suggest that the pre-issue stock price run-up reflects growth options moving into-the-money, and that managers issue equity in order to invest in these growth options. Similarly, lower post-issue returns reflect a decrease in firm risk as risky growth options are converted into less risky assets in place.

In addition to real options framework by Carlson et al. (2006), also Zhang (2005) links investments and equity issuance behavior. His model is based on time-varying required rates of return. Zhang (2005) argues that the pre-issue run-up reflects a decrease in the required return on capital. This, in turn, causes more risky projects to become positive net present value investments as the discount rate decreases. Managers issue equity to finance these investments. The low post-issue returns, on the other hand, are an obvious and unavoidable consequence of the decreased required return on capital. The implications of Zhang's (2005) model are very similar to the real options framework introduced above.

What comes to the empirical support, perhaps the most compelling evidence in favor of the real investment theory is the significance of investments as part of equity issuance process. Hansen and Crutchley (1990), Frank and Goyal (2003), and Chang et al. (2006) report results implying that the level of future capital expenditures and research and development investments is positively related to the probability of seasoned equity offering. Similarly, Fama and French

(2005) find that, in general, equity issuers' investing related uses of funds are remarkably high relative to operating cash flows. Kim and Weisbach (2007), on the other hand, report that, on average, firms invest $ 0.19 in research and development and $ 0.7 in capital expenditures for an incremental dollar raised in an equity issue during the year following the issue. When the period under review is expanded to four years, firms seem to invest $ 0.85 in research and development and $ 0.14 in capital expenditures. Kim and Weisbach (2007) regard these findings as evidence that one of the most important motives for the equity issues is to raise capital for real investment. Similarly, DeAngelo et al. (2007) show that the median increase in capital expenditures is 14.0 % of total assets from the year before to the year after the seasoned equity offering. Jung et al. (1996) report results that are in broader terms very similar to Kim and Weisbach's (2007). However, the credibility of the results of Jung et al. (1996) is somewhat questionable as the sample consists of only 168 observations. Finally, I would like to point out that according to Elliott et al. (2007), the booming investments at the time of equity offerings are not necessarily inconsistent with the market timing theory. Real investments merely create financing deficit, whereas the market timing model explains how the deficit is financed.

The evidence on announcement returns and weak long-term post-issue performance does not discriminate between the theories of market timing and real investment as the predictions of both models are similar. In addition, also high market-to-book ratios, as well as other measures of relative valuation, associated with equity issuers are consistent with the real investment theory because high relative valuation might, in fact, indicate favorable investment opportunities. As a result, it is very difficult to reject one of these two models. Only a few distinct findings seem to be consistent with one view but inconsistent with the other. Evidence on earnings management around equity offerings (e.g. Teoh et al. (1998), Rangan (1998) and Shivakumar (1999)), as well as the survey-based evidence (Graham and Harvey (2001)), provide unambiguous support to the model of behavioral market timing. Similarly, Hertzel and Li (2007) report evidence supporting this view by showing that the long-term performance of issuers is negatively and statistically significantly related only to ex ante misvaluation. On the contrary, Carlson et al. (2007) report that firm-level beta increases prior to the seasoned equity offering and decreases thereafter. In general, this pattern is consistent with the real investment theory. However, the finding is somewhat questionable because the decline in beta is found to be gradual whereas the real investment model predicts a sharp risk drop.

2.5 Alternative models of poor long-term post-issue performance

As already discussed, especially the discovery of equity issuers' low long-term stock returns in the mid-1990s stimulated the theoretical evolution around security offerings and capital structure. To this day, the models of market timing and real investment have become dominant explanations but even so, several authors have formulated competing views. The substance of these freshly minded models is clearly the rationalization of poor long-term performance and, in fact, most of these models do not even attempt to explain any other empirically observed trait of equity offerings than the post-issue return pattern. However, at least some of the models might well have elements of truth and most importantly, they deepen our understanding by criticizing and questioning the most influential theoretical models and empirical findings.

2.5.1 Managerial entrenchment theory

According to Zwiebel (1996), high valuations and investor enthusiasm facilitate equity financing, but at the same time, allow managers to become entrenched. Entrenched managers are able to run operations with minor outside control and sufficient financial slack. The core difference to the behavioral market timing is that according to the managerial entrenchment theory, managers are not attempting to exploit new investors by issuing overvalued equity. In fact, they are exploiting existing shareholders by overinvesting and not rebalancing the capital structure in later periods. Titman et al. (2004) refer to this behavior by arguing that managers are empire-builders and as a result, destroy firm value in the long run.

The theory of managerial entrenchment is consistent with the low post-issue returns in the long run (Baker and Wurgler (2002)). However, evidence contrary to the hypothesis is convincing. Particularly, the evidence from several surveys (e.g. Graham and Harvey (2001)) is widely inconsistent with the fundamental assumption that managers are exploiting existing shareholders. In addition, the intensified earnings management prior to the equity issues suggests that new shareholders form the main group subject to managerial exploitation (e.g. Teoh et al. (1998), Rangan (1998) and Shivakumar (1999)). Kim and Weisbach (2007) provide similar evidence by showing that the amount of secondary shares sold to outside investors increases with potential overvaluation. They point out that secondary shares are usually sold by insiders. Accordingly, the insiders can benefit personally from favorable valuation at the expense of new shareholders. Burch et al. (2004) examined the subsequent performance of seasoned equity issued via rights

offers and firm commitment offers, and found that underperformance entirely concentrated in the latter group. At the very least, their findings have resulted in a broadly-based rejection of the assumption that managers exploit existing shareholders by issuing equity. Thus, at its best, managerial entrenchment has only a minor and complementary role behind financing decisions.

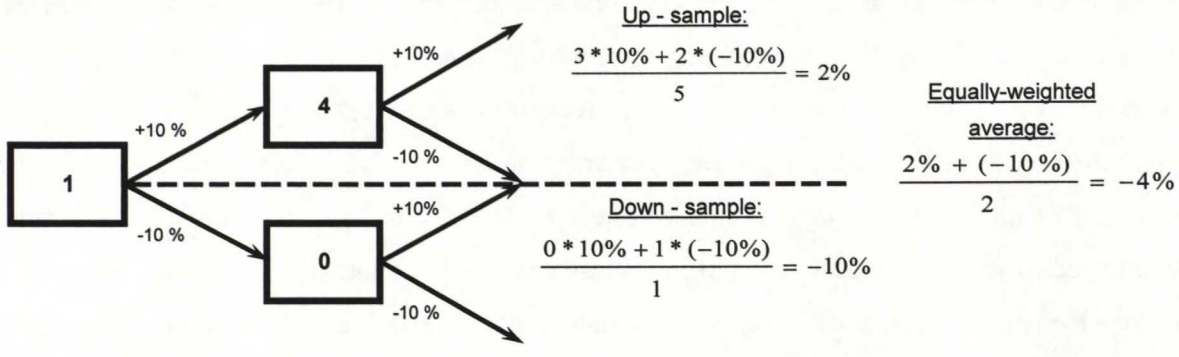
2.5.2 Pseudo market timing

Schultz (2003) proposed pseudo market timing as another explanation for the weak long-run stock returns observed after equity issues. The premise for the pseudo market timing hypothesis is that more firms issue equity as stock prices increase. It is irrelevant for the hypothesis why this happens. Schultz (2003) shows that if firms tend to issue stock after price run-ups for whatever reason, on average, issues will be followed by underperformance. As a result, the long-run performance has nothing to do with managers' ability to time the market.

Figure I illustrates the simple logic behind pseudo market timing. Consider seasoned equity offerings and suppose expected one-period returns are zero and the distribution is bimodal +10 % and -10 % in each period. There is a single equity issue at time zero. Furthermore, if the first-period return is +10 % there will be 4 issues. On the other hand, there will be no issues if the return is -10 %. We are able to observe average one-period abnormal buy-and-hold returns of 2 % and -10 % for up-sample and down-sample, respectively. This results in equal-weighted average of -4 %. Schultz (2003) refers to this train of events as pseudo market timing because it may easily be confused by the researchers with actual forecasting ability on the part of issuing firms' managers.

Figure I: Pseudo market timing

The figure presents a numerical example of the logic behind pseudo market timing. The example is based on a binomial three-period framework. Numbers placed in the boxes depict the number of equity issues which is a stochastic variable. Percentages next to the arrays depict one-period returns. The return distribution is bimodal, that is, +10 % or -10 %. The calculations on the right illustrate the equal-weighted average one-period abnormal buy-and-hold returns.



After the proposition of Schultz (2003) several author have explored to what extent pseudo market timing can explain the low returns observed after equity issues. Except for Schultz, scholars have been relatively unanimous in their view that pseudo market timing is actually only a marginal occurrence. Dahlquist and de Jong (2004), Viswanathan and Wei (2004), and Ang et al. (2005) suggest that pseudo market timing is only a potential explanation for the low post-issue returns in case of very small samples. Based mainly on simulation experiments, the authors conclude that pseudo market timing is highly unlikely to be the main factor affecting the observed low returns after equity issues. In one of the subsequent papers, also Schultz (2004) acknowledges the fact that pseudo market timing is a problem related mostly to small sample size.

2.5.3 Model misspecification and long-term post-issue performance

The findings on long-term underperformance after seasoned equity offerings appear to challenge the presumption of rational pricing in security markets. However, afterwards, broadly-based criticism has been leveled at majority of findings. The criticism is mostly based on the insight that all tests of abnormal returns are always joint tests of the model assumed to generate expected returns (Eckbo et al. (2000)).

Fama (1998) expresses his relatively radical view by arguing that the observed underperformance in the long run is caused by model misspecification. If this was true we would have to reject theories of financing decisions that are largely based on rationalizing the long-term underperformance of equity issuers. For example, market timing and rational investment models are among these theories. Fama (1998) suggests that the long-term return anomalies are sensitive to methodology. They tend to become marginal or disappear when exposed to different models for expected returns or when different statistical methods are used to measure them. Based on this, Fama (1998) concludes that the long-term return anomalies are fragile. Similarly, Eckbo et al. (2000) argue that the lower post-issue stock returns of issuers reflect a failure of the matched-firm technique to provide a proper control for risk rather than a true and robust underperformance. They argue that equity issuers are less levered and as a result, their exposure to unexpected inflation and default risks decrease relative to matched firms. It also appears that seasoned equity offerings statistically significantly increase the trading volume, which might result in lower liquidity premiums. Thus, Eckbo et al. (2000) reason that issuing firms are less

risky than the benchmarks and therefore, lower returns are a natural consequence. Furthermore, Eckbo et al. (2000) and Eckbo and Norli (2005) using zero-investment portfolios[17] show that equity issuers' underperformance is not significantly different from zero. Finally, Li and Zhao (2006) report that the underperformance of seasoned equity offerings manifests statistical inadequacy of traditional matching methods rather than an anomaly challenging the efficient markets hypothesis. Their results are based on propensity score matching[18].

Despite criticism, the considerable majority of studies indicate that equity issuers experience statistically significant long-term underperformance (e.g. Jegadeesh (2000), Brav et al. (2000) and Clarke et al. (2001)). These findings are based on several different statistical models. Moreover, researchers have examined the pattern using various time periods, countries, holding periods, flotation methods etc. Thus, it is reasonable to believe that the observed underperformance is not, at least completely, caused by model misspecification. However, the criticism has proven to be extremely advantageous to the financial research as it points out complications and highlights the importance of careful documentation and robustness checks.

3 Hypotheses

This section presents the hypotheses that will be tested in this study. I believe that the motivations for equity issuance are also reflected in the determinants of issue size and usage of proceeds. Thus, I supplement the study of determinants of issuance decision with hypotheses about the issue size and uses of proceeds. Additionally, I posit hypotheses about abnormal returns. Both short-term and long-term abnormal stock price performance are of great interest because they form a foundation of modern financing decision theories. According to the theory of market timing, abnormal returns are caused by mispricing, whereas real investment theory explains negative abnormal performance through the effects of real investments on firm risk. Overall, I have divided the hypotheses into two broad categories: determinants of issuance decision and determinants of abnormal returns. Moreover, the presentation follows consistently the central proposition of my study, that is, the concept of market timing and real investment theories being complementary to each other.

---

[17] Zero-investment portfolios used in the research of underperformance related to seasoned equity offerings are long in issuer stocks and short in matched firms. This portfolio controls effectively for any omitted risk factor.

[18] Propensity score technique is a multi-dimensional matching method introduced by Rosenbaum and Rubin (1983). The propensity score is the conditional probability of making a seasoned equity offering given ex ante firm characteristics, such as size and market-to-book ratio.

3.1 Determinants of issuance decision

Likelihood of seasoned equity offering

Market timing explanations of financing decisions predict that firms will issue equity to take advantage of high stock prices. Assuming that managers act in the best interest of long-term shareholders, they are able to create value by issuing overvalued equity. Moreover, they obtain financing at favorable cost. Despite obvious incentives to time the market, managers must also be able to perceive mispricing in order to successfully time the market. Similarly to Jenter (2005), I assume that inside information and highly specialized knowledge of the business provide managers with windows of opportunity, at least occasionally.

Carlson et al. (2006) argue that firms issue equity to invest in real options. As a result, following Kim and Weisbach (2007), I posit that one motive for the equity issue is to raise capital for investment. It is, however, important to acknowledge that I do not expect market timing and investment based reasons to be mutually inconsistent. In contrast, I believe that is likely that some equity offers could occur for each reason.

> ***H1a.*** *Likelihood of seasoned equity offerings increases with overvaluation.*
> ***H1b.*** *Likelihood of seasoned equity offerings increases with favorable investment opportunities.*

Size of equity issue

Chang et al. (2006) argue that the optimal size of the equity issue is affected by the trade-off between the gain to long-term shareholders from issuing overvalued equity and the cost of issuing too much equity. Issuing too much equity is costly, in general, because a fraction of surplus funds is likely to be wasted. As overvaluation increases, the gain to long-term shareholders increases and, at the same time, the cost of issuing too much equity remains roughly unchanged. As a result, the optimal size of equity issue becomes greater. Therefore, based on the market timing theory, I expect that the largest equity issues take place around significant overvaluation.

In the same way, I hypothesize that the size of issue increases with investment opportunities. The reason for this is relatively obvious: investment opportunities trigger demand for external financing, and the greater the investment opportunities the larger the demand for external capital becomes. I expect that the increased demand for external capital is reflected in the size of equity

offerings. Similar presumption can be based on the framework of Chang et al. (2006) where the optimal size of the equity issue trades off the gain from issuing overvalued equity against the cost of issuing too much equity. Considerable investment opportunities mitigate the problem of issuing too much equity and as a result, the optimal size of equity issue might increase even though the relative valuation remains constant.

H2a. *Size of seasoned equity offerings increases with overvaluation.*
H2b. *Size of seasoned equity offerings increases with investment opportunities.*

Usage of proceeds

I expect that, on average, firms with substantial ex ante investment opportunities actually spend a significant amount of the proceeds from the offering on financing these investments. Furthermore, following Kim and Weisbach (2007), I assume that the investments are reflected in several accounting items, such as research and development, capital expenditure, inventory, and total assets. On the other hand, I assume that the relation between investing activities and proceeds is weaker in case of firms that issue equity mainly to exploit mispricing. These firms are likely to hold a considerable fraction of proceeds as liquid assets. In addition, to avoid agency problems related to excessive cash, the firms might pay back existing debt or increase dividend payout. As a sharp contrast, firms with favorable investment opportunities and a desperate need for external financing might actually raise additional debt financing at the same time with equity issuance to obtain sufficient amount of external capital. Thus, I test the following hypotheses.

H3a. *The fraction of the proceeds from equity offerings spent on non-investment related purposes increases with overvaluation.*
H3b. *The fraction of the proceeds from equity offerings spent on investing activities increases with investment opportunities.*

3.2 Determinants of abnormal returns

Announcement effect

According to the behavioral market timing model, the stock prices reflect the underlying fundamentals only on average, causing highly undervalued firms to avoid dilutive equity issues. Therefore, the decision to issue equity reveals the presumable overvaluation and as a result, investors discount the stock price of equity issuers. According to Miller (1977), high short-sale costs result in a situation where the stock prices reflect only the valuation of the most optimistic investors. Furthermore Miller (1977) argues that the most optimistic shareholders discount their

valuation the most in response to negative signals. Thus, I expect that the observed negative price reaction is greater among significantly overvalued firms.

On the other hand, real investment theory articulated by Carlson et al. (2006) demonstrates that the stock price reaction to the announcement of seasoned equity offering is negative even without mispricing. Their argument is based on the assumption that investment projects may be risky, but real options on these projects are even riskier. Carlson et al. (2006) argue that managers issue equity in order to finance the investment projects and, at the same time, the risky real options are converted into less risky assets in place. As a result, the overall firm risk decreases, which, in turn, results in a lower required rate of return on equity. Thus, negative abnormal returns around the announcement of equity offering reflect a decrease in risk. Moreover, the greater the risk reduction, the more negative the abnormal returns will be. Again, I acknowledge that market timing and real investment based explanations may both contain elements of truth. To conclude, I test the following hypothesis.

> ***H4a.*** *Negative market reaction to the announcement of equity offerings increases with overvaluation.*
> ***H4b.*** *Negative market reaction to the announcement of equity offerings increases with investment opportunities that are converted into less risky assets in place.*

It is, however, important to realize that these assumptions are critically dependent on the market's ability to separate the firms with favorable investment opportunities from the ones with less favorable opportunities. Similarly, the hypotheses implicitly assume that investors are able to discriminate overvalued issuers from the more moderately valued ones.

Long-term post-issue performance

According to the market timing theory of financing decisions, managers choose to issue equity when firms are overvalued. According to, for example, Baker and Wurgler (2002), investors might underreact to the announcement of equity offering. I expect this to be true and as a result, the initial overvaluation at the time of the offering is reversed only after several years. This, in turn, results in poor long-term stock return performance after the issuance. Based on the argumentation above, it is reasonable to expect that ex ante overvaluation is negatively related to the post-issue abnormal returns.

On the other hand, Carlson et al. (2006) suggest that managers issue equity to convert risky real options into less risky assets in place. Therefore, as a compensation for the decrease in firm risk,

the required rate of return on equity falls, which, in turn, is directly reflected in the lower post-issue stock returns. Furthermore, I expect the post-issue abnormal performance to be dependent on the magnitude of risk reduction.

H5a. *Post-issue underperformance increases with overvaluation.*
H5b. *Post-issue underperformance increases with investment opportunities that are converted into less risky assets in place.*

Table 4: Summary of hypotheses

Issuance decision	
Likelihood of seasoned equity offering	
H1a.	Likelihood of seasoned equity offerings increases with overvaluation.
H1b.	Likelihood of seasoned equity offerings increases with favorable investment opportunities.
Size of equity issue	
H2a.	Size of seasoned equity offerings increases with overvaluation.
H2b.	Size of seasoned equity offerings increases with investment opportunities.
Usage of proceeds	
H3a.	The fraction of the proceeds from equity offerings spent on non-investment related purposes increases with overvaluation.
H3b.	The fraction of the proceeds from equity offerings spent on investing activities increases with investment opportunities.
Abnormal returns	
Announcement effect	
H4a.	Negative market reaction to the announcement of equity offerings increases with overvaluation.
H4b.	Negative market reaction to the announcement of equity offerings increases with investment opportunities that are converted into less risky assets in place.
Long-term post-issue performance	
H5a.	Post-issue underperformance increases with overvaluation.
H5b.	Post-issue underperformance increases with investment opportunities that are converted into less risky assets in place.

4 Data

This section of the thesis introduces the data sample. The first part of this chapter concentrates on the central choices regarding the sample. Next, I present the data sources and the collection process. Finally, a broad description of the final sample is included.

4.1 Outline of the sample

The sample employed in this study consists of U.S. companies that are listed in NYSE[19], NASDAQ[19] or AMEX[19] between January 1st 1982 and December 31st 2006. I have chosen U.S. companies as a basis of my data set because of two reasons. Firstly, my research is highly data

[19] The New York Stock Exchange (NYSE), National Association of Securities Dealers Automated Quotation System (NASDAQ), and the American Stock Exchange (AMEX) are New York-headquartered stock exchanges with 2 764, 3 219 and 879 listed securities, respectively (October 1st, 2007).

intensive and the quality of results depends heavily on the sample size. U.S. financial markets are the largest and most developed in the world and therefore, I assume that I am able to collect a satisfactory data set using U.S. data solely. Therefore, I am able to avoid certain problems related to the samples collected from multiple countries, such as inconsistent legislation, financial reporting, as well as varying business conventions and market structures. Secondly, the prior empirical research on equity issuance is highly concentrated on the U.S. data. As a result, by using similar dataset, I am able to make more credible comparisons with the implications of other studies.

Following the prior literature, I exclude financial institutions, insurance and real-estate firms, as well as regulated utilities, (2-digit SIC Codes[20] 49 and 60-69) from the sample. Consequently, the results are not seriously affected by the regulatory environment since the industries facing the most intensive monitoring system, self-regulation and code of operation are not included.

I do not require that firms are continuously listed in the data set. Therefore, the sample includes also bankruptcies, delistings, initial public offerings, and mergers and acquisitions. However, certain measures employed in the analysis impose an additional restriction on the data as they are calculated using variables over a period of three years[21]. Therefore, I implicitly impose a minimum three-year survival bias on the firms in the sample. However, I do not expect that the credibility of my results is affected because of this survival bias, especially as the three-year period is relatively short and, in fact, it is almost impossible to avoid the survival bias completely.

4.2 Data collection process

The core data was obtained using the following two-step procedure. Firstly, I obtained NYSE, NASDAQ and AMEX constituent lists from Thomson ONE Banker internet-based interface. At this point, based on the reported SIC Codes, I performed the industry-related exclusion discussed above. Based on a list of over 26 000 companies listed in NYSE, NASDAQ or AMEX at some point between 1982 and 2006, I collected the required data items from several sources. I used

[20] The Standard Industrial Classification (SIC) Code is a U.S. Department of Commerce system that organizes all industry types in the USA. Each business establishment is classified by its primary business activity and marked with 4-digit SIC Code. 2-digit SIC Code, on the other hand, depicts broader industry groups.

[21] Stock price run-up that is employed in the empirical tests as an explanatory variable is calculated using the stock price information over the past three years. In addition, projected future investments and cash flow require data from the previous three years.

Thomson Financial Datastream database[22] to obtain stock quotations and other relevant equity market variables. Thomson Financial Worldscope[23] provided the required accounting-based items. Data on analyst coverage was obtained from Institutional Broker Estimate System database (I/B/E/S)[24], Historical Summary File being my main source of analyst related information. After the first-step data collection, I removed firm-years for which the required key data items were not available. Secondly, I obtained data on security issuance from Thomson Financial SDC Platinum database[25]. The equity offerings were paired with the corresponding first-step data fields based on firm and year. Considering the two-step procedure I used, the main drawback is that, to some degree, the sample might be biased because it is partially data availability driven. As I accepted only firm-years with the key data items available, a few seasoned equity offerings made between 1980 and 2006 are left out from the final sample. However, there is no reason to exaggerate the problem. It is important to acknowledge the possible small-scale bias, but on the other hand, empirical research is always dependent on the data availability. Finally, supplementary data was obtained from the data libraries of Kenneth French and U.S. Bureau of Economic Analysis, as well as LexisNexis news database.

To mitigate the impact of outliers, all continuous variables are winsorized at 0.5 % and 99.5 %. Moreover, to improve the data quality and the credibility of results, I have imposed various criteria on the firm-year observations. To be included in the final sample, equity offerings must satisfy the following criteria:

1. The offering is a follow-on public common stock offering. As a result, initial public offerings, private placements and spin-off related offerings were excluded.
2. The majority of the issued shares are primary, that is, newly registered shares of common stock sold by the company. In addition, 204 observations were removed because the breakdown of shares into primary and secondary was not available.
3. Primary exchange where the new shares are listed is NYSE, NASDAQ or AMEX.

---

[22] Thomson Financial Datastream makes available information about stock prices, trading volumes, dividends and earnings of over 50 000 companies from 60 markets worldwide.

[23] Thomson Financial Worldscope covers over 40 000 companies worldwide providing financial statements based information, as well as descriptive information about companies and their products.

[24] I/B/E/S database includes historical earnings estimates, analyst coverage details and recommendations for approximately 35 000 companies worldwide.

[25] Thomson Financial SDC Platinum provides information about financial transactions, such as over 290 000 security issues and more than 273 000 mergers and acquisitions.

4. Proceeds from the offering exceed 0.5 % of the total assets at the end of the year before the offering. Thus, only offerings that can be regarded as somewhat material for the company are accepted. In addition, 366 observations were removed because the information about the proceeds was inadequate.
5. The deviation between the reported proceeds and pro forma proceeds calculated by multiplying the total number of issued shares by the issue price is less than 10 %. Hence, the contamination of the sample by miscoded entries is minimized.

Furthermore, the following criteria apply to all firm-year observations. Thus, to be included in the final sample, observations associated with equity offerings, as well as control observations, must meet these additional requirements.

1. The most important data items, including total assets, net income, book value of equity, total long-term debt, stock price quotations, and market capitalization, are available.
2. Firm-year observations do not include apparent defects. For example, negative sales, stock price or market capitalization is a strong signal of miscoded entry.

What comes to the sample size, the two-step data collection procedure described above produced an initial sample of 370 902 firm-years, including 8 691 seasoned equity offerings. As a result of the imposed requirements introduced above, the sample size decreased to 87 946 firm-years. Within the final sample, 2 193 firm-year observations are associated with seasoned equity offering, and the remaining 85 753 firm-years act as a control group. All in all, the sample includes observations of 8 483 individual companies. As a result, the average length of company-specific time-series is 10.11 years.

4.3 Descriptive statistics

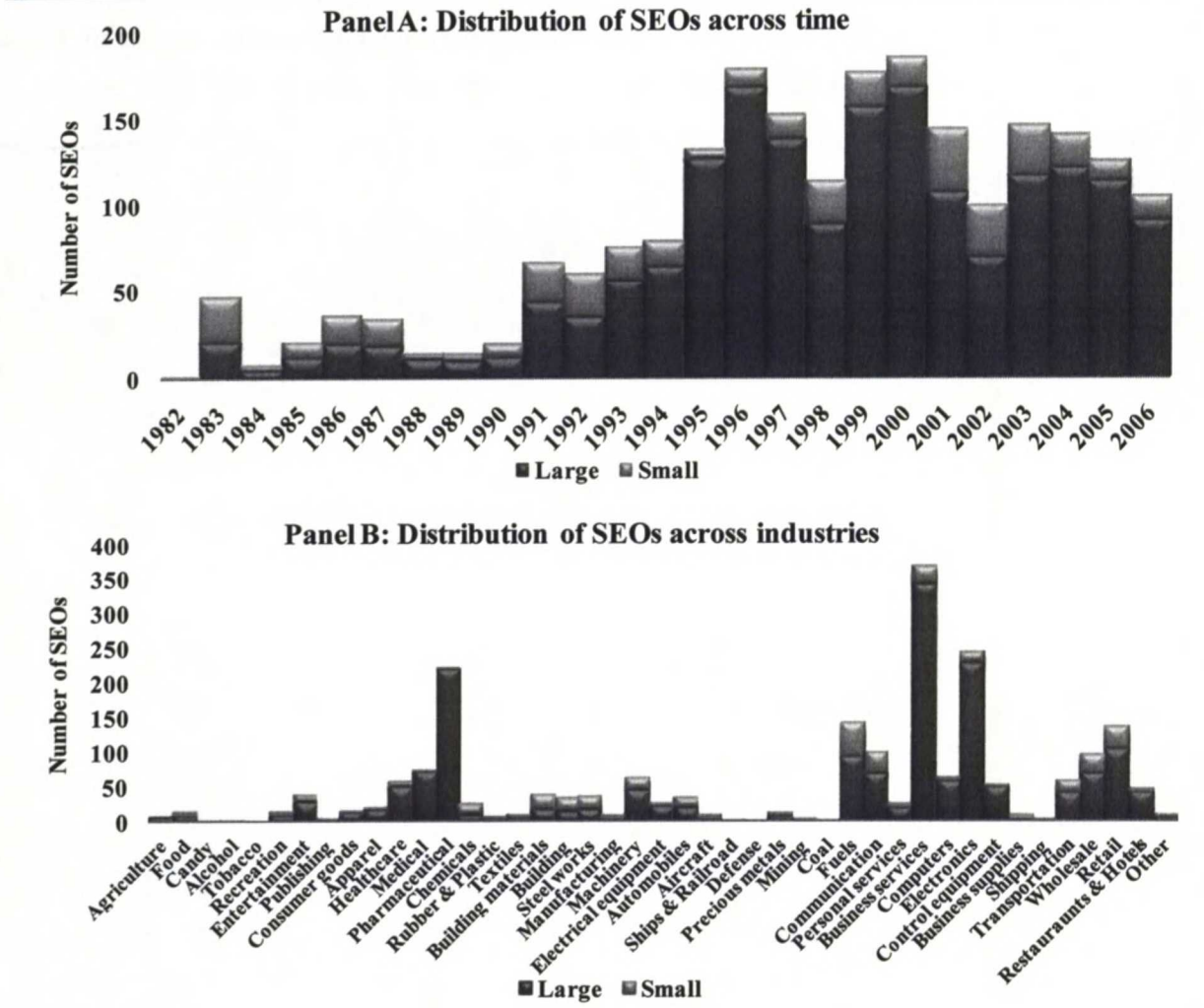
Panel A in Figure II describes the frequency of seasoned equity offerings by year in the sample. The most prominent feature of Panel A in Figure II is clearly the dramatic increase in the number of large seasoned equity offerings from one in 1982 to 105 in 2006. The annual frequency of seasoned equity offerings peaked in year 2000 with 186 issues. In addition, years 1996 and 1999 experienced exceptionally high offering volume. During the last few years, the offering volume has decreased constantly. Moreover, it seems that the number of small seasoned equity offerings has remained relatively steady throughout the whole period under review. To some degree, the

dramatic increase in the offering volume in the sample is explained by the gradually improved documentation and data availability. Still, by far the most important reason behind the depicted pattern is the actual growth in the frequency of equity issues. For example, Eckbo et al. (2007), studying 11 151 seasoned equity offerings registered with the SEC[26] during the period from 1980 to 2003, report that only 14.8 % of issues took place in the 1980s. Furthermore, according to the study, slightly over one third of the offerings in the 1980s were made by regulated utilities or financial institutions which are completely excluded from my sample.

[26] Securities and Exchange Commission (SEC) is the primary federal regulatory agency for the securities industry in the USA. The responsibilities of SEC include the promotion of full disclosure and investor protection.

Figure II: Distribution of seasoned equity offerings across time and industries

The figure presents the distribution of seasoned equity offerings across time and industries. The Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope, and the period under review is from 1982 to 2006. Large equity issue corresponds to transactions in which the net equity issued exceeds 10 % of the total assets at the end of the previous year. Small equity issue corresponds to transactions in which the net equity issued lies between 0.5 % and 10 % of the total assets at the end of the previous year. Panel A presents the total number of seasoned equity offerings across the period under review. Year is the calendar year in which the offering is made. Panel B presents the total number of seasoned equity offerings across industries. Industry classification is based on Fama-French 48 industry system.



As Panel B in Figure II indicates, the industries with the highest frequency of seasoned equity offerings include pharmaceuticals, business services and electronics. On the other hand, candy, alcohol, tobacco, ships and railroad, defense, mining, coal, and shipping are industries associated with less than five issues during the period under review. Considering the average frequency of 51.0 offerings per industry and the standard deviation of 74.1, the variation across industries is relatively large. Partly, the variation is attributable to the composition of industrial population. For example, business services and electronics are the largest industries in the total NYSE-

NASDAQ-AMEX universe and as a result, it is not a great surprise that a considerable number of seasoned equity offerings arise in these industries. However, looking at Panel B in Figure II, it seems evident that, to some degree, the industry affects the probability of seasoned equity offering. Overall, there is moderate industry clustering in the sample. I do not expect this to cause significant problems and what is more, the regression results are corrected for within-industry clustering.

5 Methodology

In this section, I discuss the most important methodology employed in the thesis. The methodology section proceeds along the following division: regression models, short-term abnormal returns, and long-term abnormal returns.

5.1 OLS regression

I perform ordinary least squares regressions to study the size of seasoned equity offering and the usage of proceeds. In addition, I examine factors affecting the magnitude of the announcement effect and the long-term performance of equity issuers using the OLS model.

As described by Dougherty (2002), the ordinary least squares regression assumes that the dependent variable Y depends on k-1 explanatory variables $X_2, X_3, \ldots, X_k$ according to a true, but unknown relationship

$$Y_i = \beta_1 + \beta_2 X_{2i} + \ldots + \beta_k X_{ki} + u_i . \quad (1)$$

Given a set of n observations on $Y, X_2, X_3, \ldots, X_k$, the OLS method is used to fit the equation

$$\hat{Y} = b_1 + b_2 X_{2i} + \ldots + b_k X_{ki} . \quad (2)$$

This is done by choosing $b_1, b_2, \ldots, b_k$ so that the sum of squares of the residuals is minimized, that is, min $\sum_{i=1}^{n} e_i^2$. The residual, e_i, is defined as $e_i = Y_i - \hat{Y}_i$. The regression coefficients, $b_1, b_2, \ldots, b_k$, provide an estimate of the impact of explanatory variables, $X_2, X_3, \ldots, X_k$, on the dependent variable, Y.

To evaluate the joint explanatory power of the independent variables included in the regression, I report the coefficient of determination, R^2. The coefficient of determination is a statistical measure of how well the regression line approximates the real data points. The theoretical

minimum of R^2 is 0, whereas an R^2 of 1.0 indicates that the regression line perfectly fits the data. In addition to R^2, I report the F-test statistic, a measure of goodness of fit that is based on the null hypothesis $H_0 : \beta_k = 0$. The significance of an individual coefficient can be evaluated via its t statistic. Throughout the empirical tests, the standard errors I use in the calculation of the t statistic are based on the heteroskedastic-consistent Huber-White sandwich estimator (White (1980)). In addition, to address the concentration of observations on certain industries in the sample, I allow for industry-level clustering of observations.

5.2 Logit regressions

In an attempt to examine the determinants behind the decision to issue seasoned equity, I compare the characteristics of issuing firms with those of firms that do not issue equity. In particular, I do this by estimating a multivariate logit probability model to specify the functional relationship between a firm's characteristics and its likelihood to issue seasoned equity. Similar models have been used to evaluate the debt-equity decisions (e.g. Marsh (1982), Hovakimian et al. (2001), and Chang et al. (2006)) and decisions to issue equity (e.g. Dittmar and Thakor (2007) and Alti and Sulaeman (2007)).

As described by Dougherty (2002), the multivariate logit model specifies the probability, P_{ij}, that firm i will belong to event j as a function of a vector Z_i. Vector Z_i is based on the characteristics of the firm i, that is, X_i. The probability of the occurrence of the event is then determined by the function

$$p_i = F(Z_i) = \frac{1}{1+e^{-Z_i}}, \tag{3}$$

where

$$Z_i = \beta_j X_i = \beta_0 + \beta_1 X_1 + ... + \beta_n X_n, \tag{4}$$

where β_j is a vector, and $\beta_0, \beta_1, ..., \beta_n$ are the individual parameters corresponding to firm-specific characteristics. The parameters of the model are determined by the maximum likelihood estimation which will yield efficient estimates in large samples.

There is no measure of the model's explanatory power equivalent to R^2 in maximum likelihood estimation. Numerous measures of goodness of fit have been suggested in the literature. Following the prior financial literature, I have chosen to report pseudo-R^2 as an indicator of

model specification's applicability to the data. The interpretation of pseudo-R^2 is similar to that of traditional R^2. I use X^2 test to measure the goodness of fit. The significance of an individual coefficient is measured by its z statistic. The interpretations of X^2 and z are similar to F and t, respectively.

In addition to the traditional logit models, I employ multinomial polytomous logit model to examine the factors affecting the size of seasoned equity issue. For example, Chang et al. (2006) use similar specification. Multinomial logit regression is useful in situations where the dependent variable, Y, consists of more than two categories j. The total number of categories, m, is unlimited. Specifically, I estimate the following model

$$\frac{\Pr(Y_i = 1)}{\Pr(Y_i = 2)}, \tag{5}$$

where

$$\Pr(Y_i = j) = \frac{e^{X_i \beta_j}}{1 + \sum_{j=1}^{m} e^{X_i \beta_j}}, \tag{6}$$

where, similar to traditional logit model, β_j is a vector of individual parameters corresponding to firm-specific characteristics X_i. The reported measures of goodness of fit are similar to the traditional logit model.

Considering the characteristics of financial data, it is reasonable to expect that that the assumptions of homoskedastic residuals and absence of outliers are not met. In addition, it is likely that the model specifications suffer from the problem of omitted variables which may affect logit regressions severely. As a result, following Chang et al. (2006), I use bootstrapping to derive alternative estimates for standard errors. Bootstrapping is a statistical method for estimating the distribution of various parameters by sampling with replacement from the original sample. According to Horowitz (1994), bootstrapping may greatly improve the finite-sample properties of generalized linear models. However, as a result of relatively large sample size, I expect that bootstrapping methodology produces estimates that are similar to standard maximum likelihood estimation.

For the logit model, the estimated coefficients do not have a direct economic interpretation. To address this shortcoming, I report the marginal effect of each coefficient. In logit models, the

marginal effect is the slope of the probability curve of an individual variable, holding all other variables constant. When a somewhat continuous variable grows by one, the marginal effect roughly indicates the increase in the probability of the event.

5.3 Heckman selection model

To address the problems of self-selection and endogeneity, I employ Heckman selection model to study the determinants behind the size of seasoned equity offering. The core logic behind the Heckman selection model is simply that the probability of observing the event is estimated simultaneously with the primary regression model of interest. Specifically, following the presentation of Li and Prabhala (2007), the estimation procedure begins with the selection equation

$$z_i^* = w_i\alpha + \varepsilon_i$$
$$z_i = \begin{cases} 1 & if \quad z_i^* > 0, \\ 0 & otherwise \end{cases} \tag{7}$$

where z_i^*, the dependent variable, is the propensity of an observation to be included in the sample, w_i is a vector of firm-specific characteristics, α is a vector of regression coefficients, and ε_i is the random disturbance term. The outcome equation, on the other hand, is similar to standard OLS specification, that is, Equation 1.

5.4 Short-term abnormal returns

To evaluate the short-term shareholder wealth effects of seasoned equity offerings, I examine cumulative abnormal returns to equity issuers' shareholders around the announcement of the offering. I employ the standard market model based event study methodology presented by Brown and Warner (1980, 1985).

The market returns, R_{mt}, are based on the daily returns for the S&P 500 index[27]. R_{it} is the return for each sample security i for time period t relative to the announcement of seasoned equity offering. The returns for a particular issuer are regressed on the market returns for a clean estimation period of -300 to -41 trading days before the announcement date represented by $t = 0$.

[27] Standard & Poor's 500 is a value-weighted index containing the stocks of 500 large corporations, most of which are headquartered in the USA. In general, it is thought to be the representative of the U.S. stock market as a whole.

The described ordinary least squares regression yields the required market model parameter estimates $\hat{\alpha}_i$ and $\hat{\beta}_i$ for each issuer. To be exact, I estimate the following model

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{8}$$

where R_{mt} is the return on the market index for day t, β_i measures the sensitivity of returns on firm i to the market return, α_i measures the average return not captured by the market return and ε_{it} is the disturbance term. The disturbance has a mean of zero and is independent of the market return, R_{mt}.

The abnormal return to the shareholders of firm i on day t, AR_{it} is a direct measure of unexpected change in shareholder wealth associated with the seasoned equity offering. It is calculated using the market model parameters obtained from Equation 8 in the following formula

$$AR_{it} = R_{it} - \left(\hat{\alpha}_i + \hat{\beta}_i R_{mt}\right). \tag{9}$$

Once abnormal returns for the respective firm and the time period are determined, the cumulative abnormal return for firm i during the selected event window around the announcement date is calculated by summing together the daily abnormal returns, AR_{it}

$$CAR_{i,[p_1,p_2]} = \sum_{t=p_1}^{p_2} AR_{it}, \tag{10}$$

where p_1 and p_2 are the beginning and the end of the selected event window, respectively. Cumulative abnormal returns are calculated for the entire issuer sample using several alternative event windows. The statistical significance of both abnormal returns and cumulative abnormal returns is evaluated using the t statistic.

5.5 Long-term abnormal returns

As pointed out by Kothari and Warner (2007), an event study is always a joint test of whether abnormal returns exist and of whether the assumed model of expected returns is correct. In long-horizon tests, appropriate adjustment for risk is critical in calculating abnormal stock price performance. Even a small error in risk adjustment can make an economically large difference when calculating abnormal returns in the long run. This is, in fact, in sharp contrast to short-horizon tests in which risk adjustment is straightforward and typically unimportant. As a result, whether the long-term abnormal returns discussed in the financial literature are due to mispricing,

or simply the result of measurement problems, is a continuous and unresolved issue (Fama (1998)). To mitigate the problem that abnormal returns over long horizons are highly sensitive to model choice, I employ the two different approaches, that is, buy-and-hold abnormal returns and calendar-time portfolios, as thoroughly as possible.

5.5.1 Buy-and-hold abnormal returns

According to Mitchell and Stafford (2000), buy-and-hold abnormal returns (BHAR) are the average multiyear returns from a strategy of investing in all firms that complete a specific event and selling at the end of a predetermined holding period versus a comparable strategy using otherwise similar non-event firms. Thus, as Kothari and Warner (2007) note, the most appealing feature of using BHAR approach is that these returns better resemble investors' actual investment behavior than periodic rebalancing entailed in other approaches to measure long-term abnormal performance. Barber and Lyon (1997) and Lyon et al. (1999) present similar arguments in favor of BHAR method.

Calculating buy-and-hold abnormal returns is relatively straightforward. A *T*-month BHAR for event firm *i* is defined as

$$BHAR_{iT} = \prod_{t=1}^{T}(1+R_{it}) - \prod_{t=1}^{T}(1+R_{bt}), \tag{11}$$

where R_{bt} is the return on a benchmark portfolio matched to the event firm *i*. I employ both S&P 500 index and Fama-French 5 x 5 size and market-to-book ratio matched portfolios[28] as benchmark portfolios in this study. Equity issuers are simply matched to the Fama-French portfolio with similar size and market-to-book ratio characteristics. Benchmark portfolios are naturally rebalanced each year to allow for changes of firm size and market-to-book ratio. Following the prior empirical literature, I have chosen to study holding periods of three and five years.

To further examine the underperformance and the factors affecting it, I allocate seasoned equity issuers into several groups of interest based on the firm-specific characteristics at the time of the

[28] The portfolios, which are constructed at the end of June each year, are the intersections of five portfolios formed on size and five portfolios formed on the ratio of market equity to book equity. Market equity is used as a proxy for size. The ratio of market equity to book equity in year *t* is calculated by dividing the market equity for December of *t-1* by the book equity for the last fiscal year end in *t-1*. The breakpoints of both size and market equity to book equity are NYSE quintiles. Fama and French calculate returns on these portfolios and publish them at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

offering. For each group of event firms, j, the mean BHAR is calculated as the average of the individual firms' buy-and-hold abnormal returns

$$\overline{BHAR}_{jT} = \frac{\sum_{i=1}^{N} BHAR_{iT}}{N}, \tag{12}$$

where N is the total number of individual firms, i, belonging to the group j.

5.5.2 Calendar-time abnormal returns

Jaffe (1974) and Mandelker (1974) introduced a calendar-time methodology to the financial literature. It has since been advocated by many, for example Fama (1998) and Mitchell and Stafford (2000). Fama (1998) promotes the calendar-time approach mainly because, according to him, the reliability of buy-and-hold abnormal returns suffers considerably from the correlation of returns across events. In other words, the statistical attributes of BHARs deteriorate because typically events concentrate on certain time periods. Calendar-time abnormal returns as a measure of long-term performance provide a solution to the cross-correlation problem (Fama (1998) and Mitchell and Stafford (2000)). On the other hand, Loughran and Ritter (2000) point out a significant shortcoming of calendar-time approach by arguing that the methodology might be biased towards finding results consistent with market efficiency. Their rationale is that corporate executives time the events, such as seasoned equity offerings, to exploit time-varying misvaluation. Therefore, there will be more events involving larger misvaluations in some periods than in others. As calendar-time approach weights each period equally, it possibly has a lower power to detect abnormal performance.

To implement the calendar-time abnormal returns, a portfolio j is constructed comprising all the individual firms i experiencing the seasoned equity offering within the previous T months. As a result, in each month, some new firms are added and some firms exit due to the timing of their offerings. Because the number of events is not uniformly distributed over the sample period, the number of firms included in a portfolio is not constant through time. For each portfolio j and each month t, an equal- or value-weighted portfolio excess return, R_{jt} - R_{ft}, is calculated. Finally, the resulting time series of monthly excess returns is regressed on the predetermined asset pricing model. The factor regressions in this study are based on Fama-French (1993) three-factor model

$$R_{jt} - R_{ft} = \alpha_j + \beta_j\left(R_{mt} - R_{ft}\right) + s_j SMB_t + h_j HML_t + \varepsilon_{jt}, \tag{13}$$

and Carhart (1997) four-factor model

$$R_{jt} - R_{ft} = \alpha_j + \beta_j\left(R_{mt} - R_{ft}\right) + s_j SMB_t + h_j HML_t + m_j UMD_t + \varepsilon_{jt}, \quad (14)$$

where R_{jt} is the monthly excess return on portfolio j, R_{ft} is the risk-free rate, R_{mt} is the return on value-weighted market portfolio, SMB_t[29] is the difference between the returns on small and large firms, HML_t[29] is the difference between the returns on low and high market-to-book firms, and UMD_t[29] is the difference between the returns on high and low one-year momentum firms. Finally, the variable of interest, α_j, is the average monthly abnormal return on the portfolio j over the T-month post-event period. Following the approach of Fama and French (1993), one-month U.S. Treasury Bill[30] rate and the NYSE-NASDAQ-AMEX universe are used as proxies for the risk-free rate and the market portfolio, respectively.

Whether size, market-to-book, and momentum factors represent equilibrium compensation for risk or an indication of market inefficiency remains an open question in the financial literature (Brav and Gompers (1997)). However, considering the rationale of Kothari and Warner (2007) that the purpose of an event study is to isolate the incremental impact of an event on security price performance, all the factors are essential for this study regardless of their specific interpretation.

6 Decomposition of market-to-book ratio

This chapter discusses the decomposition of market-to-book ratio in detail because this study, in many respects, is completely built on it. Firstly, I present the theoretical grounds for the decomposition and subsequently, describe the process of testing several model specifications of fundamental value empirically. Finally, I briefly compare the components of market-to-book ratio to some more traditional indicators employed in the prior literature. The discussion of the theoretical grounds closely mirrors that of Rhodes-Kropf et al. (2005).

---

[29] Fama and French (1993) and Carhart (1997) factors, SMB_t, HML_t and UMD_t, are constructed using six (SMB_t) and four (HML_t and UMD_t) value-weighted portfolios formed on size, market-to-book ratio and prior returns. SMB_t is the difference between the average return of the three portfolios of small stocks and the three portfolios of large stocks. HML_t is the difference between the average return on the two portfolios of value stocks and the two portfolios of growth stocks. UMD_t is the difference between the average return on the two portfolios of high prior return stocks and the two portfolios of low prior return stocks. The factors are calculated for July each year and include all NYSE-NASDAQ-AMEX stocks for which the market equity data is available. Fama and French publish the factors at:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[30] U.S. Treasury Bill is a negotiable debt obligation issued by the U.S. government. Treasury Bills are considered to be the safest securities available to U.S. investors.

6.1 Theoretical background

The cornerstone of the decomposition of market-to-book ratio can be summed up with the following equation

$$\frac{Market}{Book} \equiv \frac{Market}{Value} x \frac{Value}{Book}. \tag{15}$$

If we had an accurate measure for the fundamental value of equity, we could deduce the exact value of the right-hand side elements in Equation 15. The first element would measure the difference between the current market valuation and fundamental value. Rhodes-Kropf et al. (2005) reckon that the discrepancy could be the result of a behavioral anomaly or asymmetric information between informed insiders and the rest of the market. The second component, value-to-book, would then measure growth and investment opportunities without any distortions induced by misvaluation.

Following Rhodes-Kropf et al. (2005), if we assume that a perfect measure for the fundamental value of equity, v, exists, we could decompose the market-to-book ratio into three specific components by proceeding through the following 4-step algebraic presentation. Firstly, the conventional market-to-book ratio is expressed in logarithms

$$\frac{M}{B} = \frac{\log M}{\log B} = \log M - \log B = m - b, \tag{16}$$

where M and B depict the market and book value of equity, respectively. The lowercase letters are used to denote values expressed in logarithms. Next, the fundamental value of equity, v, is added to the model

$$m - b \equiv (m - v) + (v - b). \tag{17}$$

Furthermore, Rhodes-Kropf et al. (2005) suggest that the misvaluation captured by the first component, m-v, could be divided further. Firstly, firm-specific misvaluation arise if the market value of firm i at time t, m_{it}, diverges from the fundamental value conditional on time t and industry j, v_{jt}. Secondly, sector-specific misvaluation arise if the fundamental value conditional on time t and industry j, v_{jt}, is higher than the long-term fundamental value conditional on industry j, v_j. Finally, the substance of the second component in Equation 17, v-b, remains unchanged. As the time dimension is introduced to the model, the exact format of value-to-book component is v_j-b_{it}, that is, the difference between the long-term fundamental value conditional

on industry j and book value of firm i at time t. To sum up, the algebraic presentation evolves as follows

$$m_{it} - b_{it} \equiv (m_{it} - v_{jt}) + (v_{jt} - v_j) + (v_j - b_{it}). \tag{18}$$

Finally, the approach of Rhodes-Kropf et al. (2005) to estimating the fundamental value, v, conceptually involves expressing it as a linear function of the accounting variables of firm i at time t, θ_{it}, and a vector of conditional accounting multiples, α. To be more precise, α_{jt} refers to industry-specific accounting multiples in year t, whereas long-term industry-specific multiples are represented by α_j. Thus, Equation 18 can be rewritten as

$$m_{it} - b_{it} \equiv \underbrace{\underbrace{\lfloor m_{it} - v(\theta_{it};\alpha_{jt}) \rfloor}_{\text{firm-specific error}} + \underbrace{\lfloor v(\theta_{it};\alpha_{jt}) - v(\theta_{it};\alpha_j) \rfloor}_{\text{time series sector-error}}}_{\text{total error}} + \underbrace{\lfloor v(\theta_{it};\alpha_j) - b_{it} \rfloor}_{\text{long-term value-to-book}} . \tag{19}$$

The interpretation of each component stems directly from the step-by-step proceeding reasoning discussed above.

- **Firm-specific error.** The difference between the market value and period-dependent fundamental value is measured by this component. The component mainly reflects misvaluation.
- **Time-series sector error.** The difference between period-dependent and long-term fundamental value reflects the extent to which the whole sector, or possibly the entire market, may be mispriced at time t.
- **Long-term value-to-book.** The third term measures the difference between firm value implied by the long-run sector multiples and the book value. This measure can be interpreted as the investment and growth opportunity component of market-to-book ratio.

The second component, time-series sector error, is essential to the research question studied by Rhodes-Kropf et al. (2005). They tested theories of mergers where industry misvaluation plays a central role. As I investigate the effects of misvaluation and investment opportunities on seasoned equity offerings, the sharp division of the total error into firm-specific and time-series sector components is less informative about the hypotheses of this study. Thus, I confine the empirical tests to firm-specific error and long-term value to book and as a result, drop the time-series sector error from the empirical analyses because of two reasons. Firstly, considering the focus on misvaluation, time-series sector error does not have a meaningful interpretation as a stand-alone

measure. Secondly, the total error, that is, the combination of firm-specific and time-series sector error, correlates strongly with the firm-specific error. Empirically, the estimated correlation coefficient is nearly 0.96. As a result, the incremental explanatory power of the total error over firm-specific component is insignificant. Furthermore, the empirical findings can be presented in a more compact manner without time-series sector error.

6.2 Alternative models of fundamental value

It is important to emphasize that despite the rational theoretical framework, a critical element in identifying the components of market-to-book ratio is determining an estimate of the true firm value, v. The credibility and quality of results are strongly dependent on the attributes of the chosen valuation methodology. As we all know, the fundamental value of a firm is always unobservable and therefore, alternative proxies for the fundamental value have to be employed.

As discussed in the previous section, Rhodes-Kropf et al. (2005) estimate the fundamental value based on accounting variables and corresponding accounting multiples. Therefore, an essential stage of the model specification process is to determine which accounting items are the most suited for determining the fundamental value. Firstly, in the spirit of Lee et al. (1999) and Elliott et al. (2007), Rhodes-Kropf et al. (2005) employ book value of equity as an explanatory variable for the fundamental value. According to them, the multiples corresponding to book value should converge to unity in the long run because competitive entry and technological evolution force the return on equity equal to its opportunity cost. Similarly, the book value multiple can be expected to capture differences between the expected future returns and discount rate. Based on Rhodes-Kropf et al. (2005), Barth et al. (2001), and Collins et al. (1997), net income is able to explain cross-sectional variations in market values. In addition, it is a direct measure of profitability and as a result, it is natural to include net income in the valuation model. Finally, to account for the possibility that within-industry differences in leverage affect the valuation, the leverage ratio is included in the model, as well. For example, Mikkelson and Partch (1986) and Brennan and Schwartz (1978) show that within-industry variations in leverage have a statistically significant effect on the observed value of equity.

Considering the industry classification, Rhodes-Kropf et al. (2005) use Fama-French 12 industry classification. In sharp contrast, I employ Fama-French 30 industry based classification[31] in my study. According to some preliminary analyses, a considerable fraction of the firms in my sample would have belonged to the remainder group of unclassified firms according to Fama-French 12 industry classification. Moreover, this group proved to contain a particularly diverse array of firms and as a result, the explanatory power of the fundamental value models was relatively low. As the quality grade of the measure of fundamental value is a vital aspect of this study, I adopted a more precise classification system. The large sample size ensures that each industry incorporates enough observations in order to attain credible results.

Firstly, I estimated the following OLS-model to determine the required accounting multiples

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \varepsilon_{it}, \tag{20}$$

where m_{it} and b_{it} are the market and book value of equity, respectively, of firm i at time t, and α denotes the multiples, that is, the regression coefficients. The regression model is estimated separately for each industry. The time-series averages are shown in Table 5. As we are able to see, the coefficients, as well as the goodness of fit, vary considerable across industries. On the other hand, considering the simple model specification, the average R^2 values are surprisingly high. This is perhaps attributable to the precise industry classification. Capital intensive industries, such as aircraft, business supplies and transportation, have the highest R^2 values and the lowest constant terms, as well. According to Rhodes-Kropf et al. (2005), this pattern is natural because, in general, tangible book assets are highly correlated with the market value in these industries. Second alternative model specification incorporates net income,

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{abs} + \alpha_{3jt} ni_{it}^{-} + \varepsilon_{it}, \tag{21}$$

where the additional variables ni_{it}^{abs} and ni_{it}^{-} are the logarithm of absolute net income and dummy variable being 1 if net income is negative, respectively. This specification allows for the usage of logarithms and, at the same time, acknowledges the sign of net income. Table 5 shows that the overall goodness of fit improves significantly from the first specification, that is, Equation 20. Furthermore, the estimated coefficients make intuitive sense: the book equity and

[31] The basis for the employed industry classification is Fama-French 30 industry system. Utilities (FF20) and Financial companies (FF29) are completely excluded from the sample. Because of only a few observations, Alcohol (FF02), Tobacco (FF03), Textiles (FF10), and Coal (FF18) are included in the group Others (FF30). Detailed information about the base classification is available at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

net income are associated with positive coefficients, whereas accounting losses affect the valuation estimate negatively. In addition, the loadings on the book value of equity have fallen significantly. Finally, to account for the effects of leverage, I estimate a third specification

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{abs} + \alpha_{3jt} ni_{it}^{-} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}, \quad (22)$$

where the additional variable, LEV_{it}, denotes the book leverage. As one might expect, the leverage is associated with negative regression coefficients across industries. Compared with the second specification, other coefficients remain approximately unchanged. However, most importantly, the overall goodness of fit of the third specification is significantly higher than that of the two alternative models. As a result, similar to Rhodes-Kropf et al. (2007) and Hertzel and Li (2007), I choose the third specification, that is, Equation 22, as my valuation methodology because of its superior explanatory power relative to the first two models of fundamental value. Finally, the accounting multiples calculated through the third specification are applied in Equation 19 to obtain estimates of market-to-book components. Appendices A1, A2, and A3 present the estimated multiples based on all the three specifications in detail.

As a comparison, Rhodes-Kropf et al. (2007) report that the average R^2 and the standard deviation of R^2 stand at 0.85 and 0.041, respectively, whereas Hertzel and Li (2007) show values of 0.86 and 0.032. Considering the average R^2 of 0.91 and the standard deviation of 0.023 in my specification, the valuation multiples of this thesis seem to provide the best and most consistent fit. For the most part, this is attributable to the more precise industry classification. If Fama-French 12 industry classification was employed, the overall goodness of fit would be somewhat similar to the other two papers.

Table 5: Time-series average accounting multiples from fundamental value regressions

The table reports the time-series average multiples from fundamental value regressions. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Specifically, the results are based on regression Equations 20, 21, and 22. The dependent variable is the natural logarithm of market value. The independent variables are the natural logarithm of book value of equity, the natural logarithm of the absolute value of net income, a dummy variable indicating when the net income is negative, and book leverage. The regression is estimated cross-sectionally at the industry-year level for each of the industries. The reported coefficients, as well as R^2, are industry level averages for the period from 1982 to 2006.

	Coefficients	Food	Recreation	Publishing	Consumer goods	Apparel	Healthcare	Chemicals	Building	Steel works	Manufacturing	Electrical equipment	Automobiles	Aircraft	Mining	Fuels	Communication	Services	Business equipment	Business supplies	Transportation	Wholesale	Retail	Restaurants & Hotels	Other	Median	Average
Model 1 [Eq. 20]	α_0 Intercept	0.6	0.8	0.8	0.3	0.1	1.6	1.0	0.3	0.7	0.6	1.2	0.9	0.5	1.3	1.0	1.6	1.4	0.9	0.7	0.6	0.7	0.4	0.7	0.9	**0.7**	**0.8**
	b Book equity	1.0	1.0	1.0	1.1	1.1	0.9	1.0	1.0	0.9	1.0	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	**1.0**	**1.0**
	R^2 Goodness of fit	0.85	0.79	0.86	0.84	0.80	0.81	0.87	0.84	0.79	0.85	0.72	0.85	0.91	0.70	0.86	0.84	0.73	0.82	0.89	0.86	0.79	0.82	0.81	0.71	***0.83***	***0.82***
Model 2 [Eq. 21]	α_0 Intercept	1.8	1.2	1.6	1.1	1.1	2.0	1.5	0.9	1.1	1.1	1.6	1.5	1.0	1.7	1.4	2.1	1.8	1.5	1.4	1.2	1.3	1.4	1.6	1.8	**1.5**	**1.5**
	b Book equity	0.5	0.7	0.5	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.8	0.6	0.7	0.5	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.4	**0.6**	**0.6**
	ni^{abs} Absolute net income	0.6	0.4	0.6	0.4	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.2	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.6	**0.4**	**0.4**
	ni^{-} Negative net income	-0.3	-0.2	-0.3	-0.3	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	-0.1	-0.3	-0.1	-0.2	-0.3	-0.2	-0.3	-0.2	-0.3	-0.4	-0.4	-0.3	**-0.2**	**-0.2**
	R^2 Goodness of fit	0.92	0.84	0.93	0.90	0.88	0.86	0.92	0.88	0.86	0.89	0.81	0.90	0.93	0.80	0.89	0.87	0.80	0.85	0.93	0.90	0.84	0.88	0.88	0.83	***0.88***	***0.87***
Model 3 [Eq. 22]	α_0 Intercept	2.1	1.9	2.1	1.6	1.8	2.5	2.0	1.6	1.8	1.7	2.2	1.8	1.5	2.4	1.8	2.6	2.4	2.0	1.6	1.9	2.1	2.1	2.2	2.6	**2.0**	**2.0**
	b Book equity	0.5	0.7	0.5	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.7	0.8	0.6	0.7	0.6	0.6	0.7	0.8	0.7	0.7	0.7	0.6	0.6	**0.7**	**0.7**
	ni^{abs} Absolute net income	0.5	0.3	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.4	**0.3**	**0.3**
	ni^{-} Negative net income	-0.2	-0.1	-0.1	-0.2	0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	0.0	**-0.1**	**-0.1**
	LEV Leverage	-1.2	-1.8	-1.7	-1.5	-2.1	-2.2	-1.5	-1.7	-1.6	-1.6	-2.1	-1.4	-1.4	-2.7	-1.3	-1.8	-2.1	-2.1	-1.4	-1.7	-2.0	-2.0	-1.6	-2.3	**-1.7**	**-1.8**
	R^2 Goodness of fit	0.94	0.89	0.95	0.92	0.92	0.90	0.94	0.91	0.90	0.92	0.89	0.93	0.95	0.89	0.90	0.90	0.86	0.90	0.94	0.93	0.90	0.93	0.92	0.89	***0.92***	***0.91***

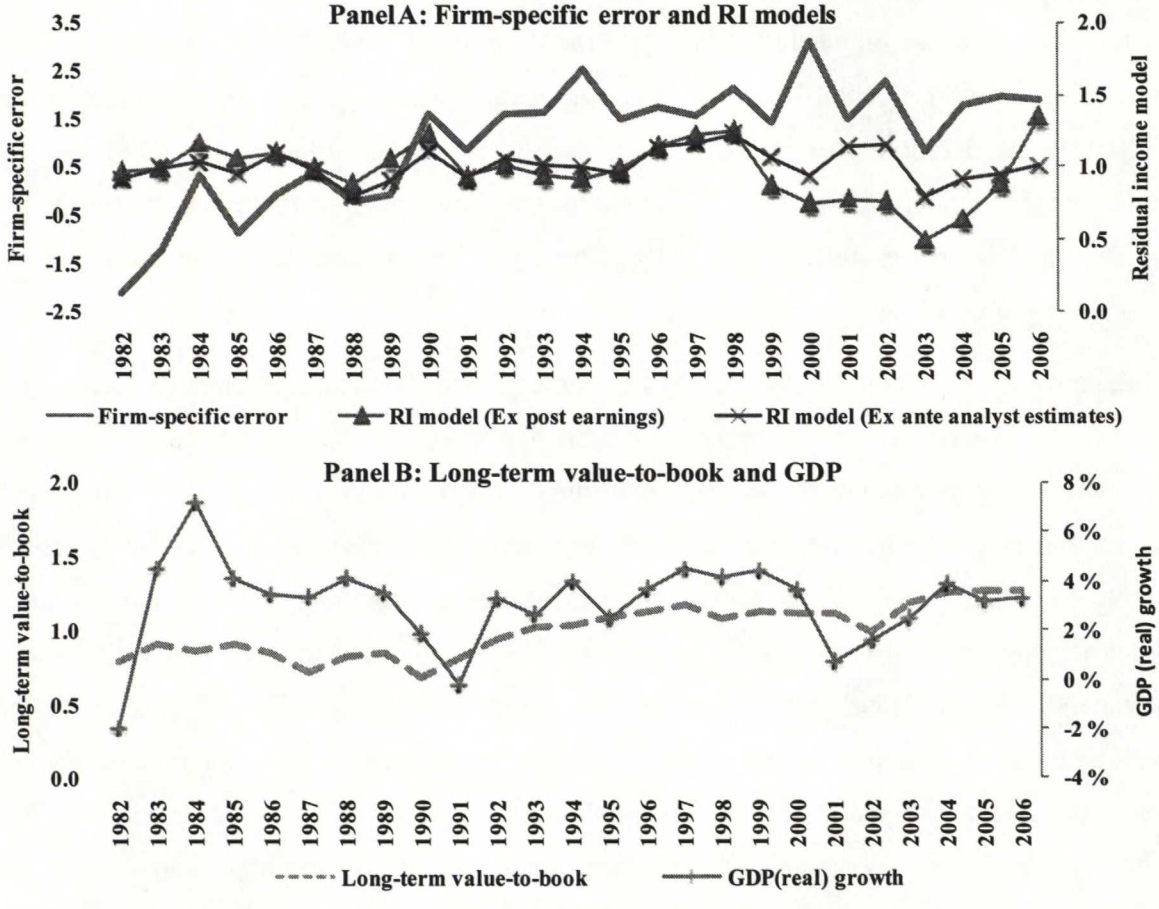
6.3 Decomposition of market-to-book and conventional financial indicators

It is of great interest to compare the components of market-to-book ratio to other mispricing and investment opportunity indicators employed in the prior literature. Furthermore, the comparisons act as an acid test of the components' credibility. Firstly, I compare the firm-specific error, that is, the misvaluation component, to residual income model. The residual income model has been employed as a mispricing measure by several authors during the recent years (e.g. Lee et al. (1999), Ang and Cheng (2006), and Elliott et al. (2007)). Panel A in Figure III shows the market-wide averages of firm-specific error and residual income based measures using both realized returns and analyst estimates by year. The similar course of all three time-series is a signal of the ability of firm-specific error to detect misvaluation. The variation of firm-specific error component across years, as well as individual firms, is considerably greater compared to other misvaluation indicators. As a result, the error component might discriminate between the overvalued and undervalued firms more effectively. Finally, there are certain problems associated with the residual income based valuation not observable in the time series in Panel A. Considering first the version based on ex post earnings, Elliott et al. (2007) show that financing decisions made at t_0 affect the future earnings in $t_1,\ldots,t_n$, for example, because of changes in

interest expenses. As these future earnings that are directly affected by the financing decision under review are used as a basis for the estimate of fundamental value at t_0, the valuation measure becomes biased. Similarly, the residual income model based on analyst expectations might be somewhat unreliable because of the well-known upward bias in financial analysts' earnings estimates (Ang and Cheng (2006)). For the most part, these complications are avoided by employing firm-specific error as a measure of misvaluation.

Figure III: Decomposition of market-to-book ratio and conventional financial indicators

The figure presents the market-wide average firm-specific error and long-term value-to-book against conventional indicators that are widely used in the financial literature for each year from 1982 to 2006. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, Institutional Broker Estimate System (I/B/E/S), and U.S. Bureau of Economic Analysis databases, and the period under review is from 1982 to 2006. Panel A presents comparison between firm-specific error and residual income based measures of relative valuation. Residual income model based on ex post earnings equates the fundamental value to the sum of three-year stream of discounted actual abnormal earnings and the book value of equity. Similarly, residual income model based on ex ante analyst estimates equates the fundamental value to the sum of discounted estimates of abnormal earnings for the three-year period and the book value of equity. Residual income based relative valuation is the market value divided by the corresponding fundamental value. Panel B presents comparison between long-term value-to-book and annual growth of real gross domestic product (GDP).



Except for the traditional market-to-book ratio, the prior financial literature has employed very few measures of investment opportunities. Still, there exist certain examples of other investment

related measures. Bernanke (1983) and Shapiro et al. (1986), for instance, conclude that gross domestic product is an important determinant of business fixed investments. Similarly, Clark (1979) reports that gross domestic product is the primary determinant of non-residential fixed investments. In addition, Choe et al. (1993) observe that corporate investments are typically more profitable in periods of economic expansion than during contractions. Thus, I compare my proxy of investment opportunities, that is, long-term value-to-book, to the annual growth of real gross domestic product[32]. Panel B in Figure III shows the outcome of the comparison. The time-series of the long-term value-to-book resembles evidently that of economic growth. This provides further support to the view that long-term value-to-book can be employed as a proxy for investment and growth opportunities. However, despite the sensible intuition that increased economic activity creates investment opportunities, it is important to acknowledge the shortcomings of gross domestic product as a measure of investment opportunities. Firstly, the relationship between economic growth and aggregate investments is extremely complex and infallible generalizations are problematic to make (Bernanke (1983)). Secondly, economic growth might temporarily affect the accounting variables without creating any investment opportunities (Guenther and Young (2000)). These problems might also affect the comparison shown in Panel B in Figure III.

In addition to gross domestic product, for example, Chang et al. (2006) employ projected and actual future investments as indicators of investment opportunities. Projected future investments are calculated by multiplying the average investment growth rate over the previous three years by the previous year's actual investments. Within my sample, projected future investments based on ex ante information, as well as actual future investments, seem to be significantly positively related to long-term value-to-book. Test statistics of 1.93 and 3.47 indicate that the correlation coefficients are significantly different from zero. On the other hand, projected and actual future investments are incomplete measures of investment opportunities. The problem with projected future investments is that it just naively extrapolates the previous years' investing activities to the future. Actual future investments as a measure of investment opportunities clearly suffer from endogeneity. Specifically, financing decisions might affect the future investments significantly and as a result, the observed relation between these variables might actually be spurious.

---

[32] Data on gross domestic product is obtained from the national database of U.S. Bureau of Economic Analysis (BEA). BEA releases updated estimates of gross domestic product monthly. The latest data is available at: http://www.bea.gov/national/index.htm.

7 Empirical results

This section presents and analyses the empirical results of this thesis. The first part concentrates on the determinants of issuance decision, whereas the second part examines the issuance related abnormal returns and most importantly, factors affecting them. This chapter presents a wide-ranging set of empirical experiments to study the effects of misvaluation and investment opportunities on equity issuance behavior. Throughout the chapter, misvaluation is measured by market-to-book ratio's misvaluation component, that is, firm-specific error. Similarly, investment opportunities are indicated by the component reflecting investment and growth opportunities, that is, long-term value-to-book. Despite various experiments and themes discussed in this chapter, the general storyline is most crisp: firm-specific error and long-term value-to-book are incorporated into each and every empirical test in order to deepen our understanding of how misvaluation and investment opportunities shape the real-life financing decisions.

7.1 Determinants of issuance decision

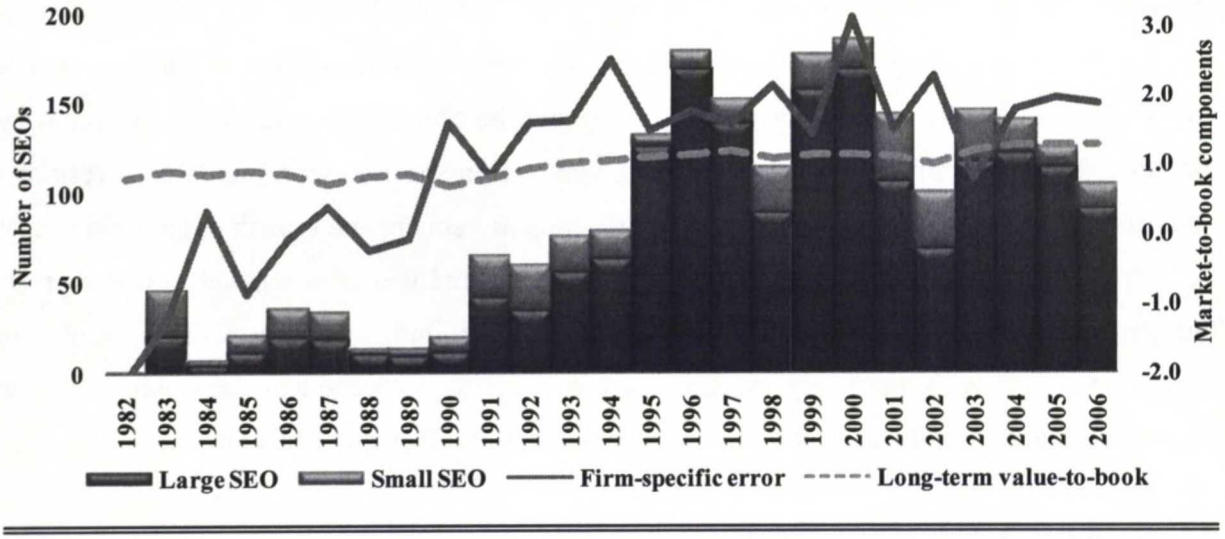
This section begins with the examination of the determinants of issuance decision through several univariate analyses and logit regression presenting one of the most important contributions of this thesis. However, DeAngelo et al. (2007) argue that a statistically significant relation between certain firm-specific variables and issuance decision observed through logit regressions does not necessarily imply economic significance. The most consequential problem is that comparisons between firms that choose to sell stock and non-issuers often exaggerate the actual effect of firm characteristics on the probability of seasoned equity offering. The critique justifies further examination. Firstly, following Chang et al. (2006), I examine the size of equity offerings because I believe that the motivations for seasoned equity offerings are reflected also in the determinants of issue size. Secondly, I investigate the usage of proceeds from the offering. For example, Kim and Weisbach (2007) suggest that firm-level uses of proceeds provide systematical evidence on the fundamental question about motives for issuing equity publicly.

7.1.1 Issuance activity and market-to-book components across time

Figure IV depicts the market-wide firm-specific error, long-term value-to-book, and equity issuance activity during the period from 1982 to 2006.

Figure IV: Market-to-book components and seasoned equity offerings across time

The figure presents the distribution of seasoned equity offerings across time and the market-wide average firm-specific error and long-term value-to-book for each year from 1982 to 2006. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Large equity issue corresponds to transactions in which the net equity issued exceeds 10 % of the total assets at the end of the previous year. Small equity issue corresponds to transactions in which the net equity issued lies between 0.5 % and 10 % of the total assets at the end of the previous year. Year is the calendar year in which the offering is made.



The most prominent feature of Figure IV is that the time-series patterns of firm-specific error and issuance activity show a striking similarity. A year-on-year increase in the average market-wide firm-specific error seems to indicate that issuance activity is on the increase, as well. Considering the whole period under review, 22 years out of 26 possible saw a similar sign change in both issuance activity and average firm-specific error. It is relatively difficult to believe that such a definite relation is merely a coincidence.

What comes to long-term value-to-book, the relation to issuance activity is not as distinctive as with firm-specific error. For the most part, this is attributable to the fact that the time-series of long-term value-to-book is fairly steady and therefore, Figure IV does not capture the relation effectively. However, a thorough examination reveals certain attributes that support the hypothesis about the positive relation between investment opportunities and issuance activity. Firstly, despite large annual variations, issuance activity has clearly increased during the period under review. At the same time, the average long-term value-to-book component has grown relatively smoothly. Secondly, the decade-specific analysis highlights the positive relation. During the 1980s, when the issuance activity was relatively flat, the average annual growth of long-term value-to-book is only 0.9 %. On the other hand, in the 1990s, the booming issuance market coincided with the average annual growth of long-term value-to-book of about 4.3 %.

After the peak in year 2000, the issuance activity has stagnated. Similarly, the growth of long-term value-to-book has leveled off significantly, being only 1.6 % per annum in the 2000s. To conclude, investment opportunities seem to affect the market-wide likelihood of equity issuance. Certainly, also factors other than misvaluation and investment opportunities might determine the issuance activity but still, the presented pattern is interesting and justifies further examination.

7.1.2 Factors affecting the probability of seasoned equity offering

Table 6 presents the decomposition of market-to-book ratio for the entire sample of equity issuers and control firm-years. In addition, traditional indicators of misvaluation and investment opportunities are reported as a robustness check.

Table 6: Decomposition of market-to-book at firm-level

The table reports the average decomposition of market-to-book ratios at the firm-level for the sample of seasoned equity issuers and for a control sample of non-issuers. In addition, comparable measures of relative valuation and investment opportunities are shown. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. Residual income model based on ex post earnings equates the fundamental value to the sum of three-year stream of discounted actual abnormal earnings and the book value of equity. Similarly, residual income model based on ex ante analyst estimates equates the fundamental value to the sum of discounted estimates of abnormal earnings for the three-year period and the book value of equity. Residual income based relative valuation is the market value divided by the corresponding fundamental value. Projected future investments is the product of average investment growth rate over the previous three years and previous year's investments. Actual future investments is the sum of actual future investments for the following three-year period. The table reports the *z* and *t* statistics for the test that medians and means, respectively, are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

		Equity issuers			Non-issuers			Difference			
		Median	Mean	N	Median	Mean	N	Difference (Medians)	*z*	Difference (Means)	*t*
Decomposition of market-to-book ratio											
log (Market-to-book ratio)	$m_{it} - b_{it}$	0.77	1.22	2 191	0.56	0.84	73 783	0.21**	2.44	0.37***	4.28
Firm-specific error	$m_{it} - v(\theta_{it}; \alpha_{jt})$	0.15	0.21	2 191	-0.11	-0.06	73 783	0.26***	17.88	0.27***	18.53
Long-term value-to-book	$v(\theta_{it}; \alpha_{j}) - b_{it}$	1.00	0.94	2 191	0.83	0.81	73 783	0.18***	13.90	0.13***	10.34
Comparable measures of relative valuation											
Residual income model, ex post earnings		2.02	3.38	1 887	1.30	2.07	60 416	0.72***	6.36	1.31***	11.64
Redidual income model, ex ante analyst estimates		2.06	2.86	1 577	1.38	1.78	32 369	0.68***	9.81	1.08***	15.63
Comparable measures of investment opportunities											
Projected future investments		0.39	0.45	1 793	0.16	0.29	54 852	0.23**	2.06	0.16***	2.68
Actual future investments		0.13	0.19	1887	0.09	0.12	60416	0.04***	6.28	0.07***	10.44

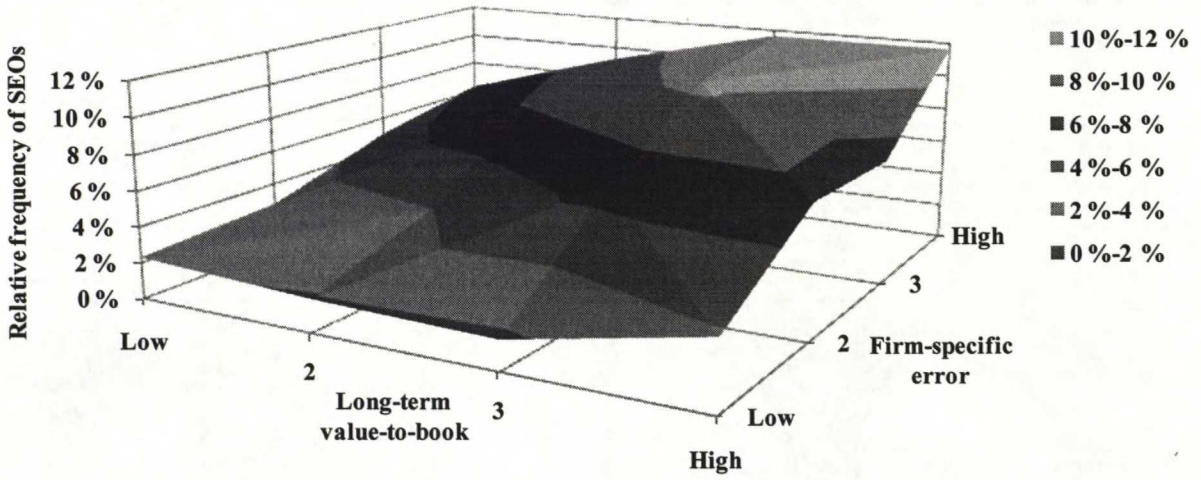
Table 6 provides evidence consistent with my hypotheses about issuance decision. The average firm-specific error and long-term value-to-book of equity issuers are significantly greater compared with the control observations. What is more, both mean and median provide remarkably similar results. Considering especially the elevated test statistics, the results presented in Table 6 strongly suggest that the likelihood of seasoned equity offering increases with both overvaluation and investment opportunities. Similar to Jung et al. (1996), Hovakimian et al.

(2001) and DeAngelo et al. (2007), the difference in market-to-book ratio is statistically significant, as well. However, the difference in the market-to-book is not as large as in case of its components. Moreover, the unpartitioned market-to-book suffers from multiple and imprecise interpretations: it measures misvaluation and future investment prospects concurrently. Also the conventional financial indicators support unambiguously the observation that both misvaluation and investment opportunities are important motives for equity issuance.

Finally, Figure V presents the distribution of observations associated with equity offering across firm-specific error and long-term value-to-book quartiles. In accordance with the prior tests, the likelihood of equity issuance increases with mispricing and investment opportunities. Specifically, I observe that as the firm-specific error and long-term value-to-book increase, the proportion of observations linked with equity offerings increases monotonically. Moreover, the differences between the highest and lowest quartile are dramatic. Figure V shows that nearly 70 % of equity issues are concentrated on the firm-years with above median firm-specific error. Similarly, over 60 % of equity issues are spread among observations with above median long-term value-to-book. To conclude, Figure V comprises the central finding based on univariate analyses into easily understandable format: the likelihood of equity offering increases with both investment opportunities and overvaluation.

Figure V: Distribution of issuer sample across market-to-book component quartiles

The figure presents the distribution of the issuer sample across firm-specific error and long-term value-to-book quartiles. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The data points are based on the fraction of firms that belong to each quartile.



To test my hypotheses more formally, I estimate a logit model of issuance decision relating the probability of equity issuance to various explanatory variables, including firm-specific error and long-term value-to-book. Table 7 reports the coefficients from the multivariate logit regression for the full sample. Model I in Table 7 is based on standard maximum likelihood estimation. In addition to coefficients, I also report the marginal effect of each coefficient. This allows us to judge the economic significance of coefficients. Model II, on the other hand, is calculated from 500 bootstrap replications. In this case, the most important benefit of bootstrapping for the analysis is its ability to mitigate the problems related to severe outliers and nonnormality. As we are able to observe, the only considerable difference between the models is related to Altman's Z-score[33]. The distribution of Z-score is notably skewed to the right and therefore, the maximum likelihood estimation produces possibly unreliable estimates of standard error which, in turn, result in overly optimistic test statistic. Finally, it is worthwhile to note that the explanatory power of all the models is in line with the prior empirical research.

[33] Altman's Z-score combines five different financial ratios to determine the likelihood of bankruptcy. In general, the lower the score, the higher the probability of bankruptcy.

$$Z-score = 3.3 * \frac{EBIT}{Assets} + \frac{Sales}{Assets} + 0.6 * \frac{Market\ \ capitalization}{Total\ \ liabilities} + 1.2 * \frac{Working\ \ capital}{Assets} + 1.4 * \frac{\text{Re}tained\ \ earnings}{Assets}$$

Table 7: Logit regression: Determinants of issuance decision

The table reports the regression coefficients and corresponding test statistics, as well as marginal effects, for the sample of seasoned equity offerings and control observations. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. The dependent variable equals 1 if seasoned equity is issued during the calendar year, and zero otherwise. Firm-specific error and long-term value-to-book are highlighted with grey color. Assets is the natural logarithm of the total assets. Tangibility is defined as the ratio of property, plant and equipment (PPE) to total assets. Deviation from target leverage is calculated by dividing the actual book leverage by the target leverage estimated through industry-specific OLS model. Z-score refers to the standard Altman's Z-score. R&D expenses denotes to the size scaled research and development expenditure. Dividends is the ratio of total cash dividends to total assets. Total discretionary accruals is difference between total accruals and non-discretionary accruals which are estimated through two-step OLS procedure. Equity issuance activity refers to the industry-specific annual frequency of seasoned equity offerings. Past equity issues is the firm-specific size scaled sum of proceeds from equity offerings made during the period of past three years. Market-to-book is simply the ratio of stock price to the book value per share. Share turnover denotes to the ratio of annual trading volume to total number of shares outstanding. Stock price run-up is the change in stock price during the previous three year. Stock return volatility is the standard deviation of daily stock returns during the previous year. Earnings volatility is defined as the standard deviation of operating income during the period of past five years. Bootstrapping estimation is based on 500 replications. Test statistics reported in parentheses next to regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

	Dependent variable: 1 in case of equity issue, 0 otherwise				
	Model I: Maximum likelihood estimation			**Model II: Bootstrapping**	
Independent variables	Coefficient	*z*	Marginal effect	Coefficient	*z*
Firm-specific error	0.33 ***	(5.31)	0.49 %	0.33 ***	(5.07)
Long-term value-to-book	0.25 ***	(3.12)	0.38 %	0.25 ***	(3.10)
Assets	-0.09 **	(-2.41)	-0.18 %	-0.09 **	(-2.31)
Tangibility	0.78 ***	(2.78)	1.16 %	0.78 ***	(2.85)
Deviation from target leverage	-0.02	(-0.61)	-0.03 %	-0.02	(-0.58)
Z-score	-0.07 ***	(-3.45)	-0.10 %	-0.07 **	(-2.42)
R&D expenses	0.13 ***	(4.45)	0.19 %	0.13 ***	(4.35)
Dividends	-40.39 ***	(-5.74)	-60.40 %	-40.39 ***	(-5.85)
Total discretionary accruals	2.82 ***	(5.08)	4.22 %	2.82 ***	(4.93)
Equity issuance activity	0.04 ***	(7.13)	0.07 %	0.04 ***	(6.59)
Past equity issues	0.04	(0.86)	0.06 %	0.04	(0.84)
Market-to-book	-0.01	(-0.39)	-0.01 %	-0.01	(-0.38)
Share turnover	-0.04 ***	(-3.32)	-0.06 %	-0.04 ***	(-3.38)
Stock price run-up	1.28 ***	(8.17)	1.92 %	1.28 ***	(8.32)
Stock return volatility	1.61 ***	(3.54)	2.40 %	1.61 ***	(3.56)
Earnings volatility	-0.39	(-1.33)	-0.58 %	-0.39	(-1.03)
Constant term		yes		yes	
Year fixed effect		yes		yes	
Industry fixed effect		yes		yes	
Number of observations		24 215		24 215	
X^2		597.95		706.73	
p-value (X^2)		0.00		0.00	
pseudo-R^2		0.10		0.10	

As shown in Table 7, the positive relation of firm-specific error and long-term value-to-book to the probability of equity issuance is strongly statistically significant regardless of model structure. Thus, after controlling for several firm characteristics, the overall results indicate that overvalued firms with favorable investment opportunities are significantly more likely to issue seasoned equity. Interestingly, the explanatory power of traditional market-to-book ratio becomes statistically insignificant after the inclusion of firm-specific error and long-term value-to-book. In contrast, Jung et al. (1996), Hovakimian et al. (2001) and DeAngelo et al. (2007) report that market-to-book ratio is a statistically significant determinant of issuance activity. Furthermore, considering my sample, market-to-book ratio is significantly positively related to the likelihood

of equity offering in a univariate setting, as shown in the previous section. Thus, it seems that the traditional market-to-book ratio, in fact, measures both misvaluation and investment opportunities to some degree. This is in compliance with the argumentation of Elliott et al. (2007).

Interestingly, despite the strong statistical significance, the marginal effects of firm-specific error and long-term value-to-book reported for the Model I in Table 7 are relatively small. Similarly, DeAngelo et al. (2007) report that the marginal effects of several misvaluation measures are questionable. They suggest that this might be attributable to the complexity of financial decision making. Several firm-specific and, most often, unobservable factors might be the most important determinants of equity issuance, while the observable misvaluation and investment opportunities remain as second-order elements. On the other hand, small marginal effects might also be caused by incomplete scale of market-to-book components. The exact magnitude of the components might be somewhat irrelevant because of unavoidable deficiencies in the quantification of fundamental value. Firm-specific error seems to be able to discriminate between undervalued and overvalued firms but it might not necessarily measure the magnitude of differences between the observations perfectly. Similar assumption might be valid also in case of long-term value-to-book. Furthermore, the avoidance of issuing undervalued equity might be the managers' main concern and as a result, the exact magnitude of misvaluation does not affect the financing decisions considerably. Therefore, it might be the case that what really counts is the perception of under- or overvaluation, not the observable magnitude.

What comes to the control variables, most often, firm's dividend history is used as a proxy for its life-cycle stage (e.g. DeAngelo et al. (2004) and Fama and French (2001)). According to DeAngelo et al. (2004) a record of large dividend payouts is the most reliable empirical indicator of a mature firm because, in general, such a record is not attainable for firms that grow rapidly and have not reached the target profitability. The prior empirical literature is relatively unanimous that the probability of seasoned equity offering is higher for young and rapidly growing firms associated with low or zero dividend payout (e.g. Chang et al. (2006), DeAngelo et al. (2007), and Huang and Ritter (2007)). In addition to dividends, I employ total assets as a proxy for the life-cycle stage. Consistent with the prior empirical literature, the likelihood of equity issuance seems to be higher with firms at early stages of corporate life-cycle, as the

coefficients of dividends and assets are significantly negative. Assets, especially tangible ones, may be used as collateral and therefore, tangibility should increase debt capacity, as well as facilitate access to debt financing. Furthermore, Chang et al. (2006) provide evidence that the tangibility of assets is negatively related to the probability of seasoned equity offering. As a result, the significantly positive coefficient of tangibility is a small surprise. On the other hand, capital intensive businesses might require considerable amounts of external financing for capital expenditure. In addition, earnings volatility can also be regarded as a determinant of debt capacity: firms with stable earnings are able operate with more debt. Surprisingly, the coefficient of earnings volatility is negative but, on the other hand, statistically insignificant.

I have included deviation from target leverage in the specification. In contrast to the predictions of the trade-off theory, it seems that the explanatory power of the firm-specific target leverage is weak, which is in line with the findings of Chang et al. (2006). Similar to DeAngelo et al. (2007), I find that Altman's Z-score is negatively related to the issuance activity. As a result, it seems that certain issues are motivated by the risk of financial distress. Research and development expenses that are significantly positively related to the probability of equity offering act as a proxy for growth prospects. Total discretionary accruals measure the scope of earnings management. Consistent with Teoh et al. (1998), Rangan (1998) and Shivakumar (1999), I find that earnings management is positively associated with equity offerings.

A strong relation between the issuance decision and the concurrent industry-specific issuance activity suggests that similar businesses require external financing simultaneously due to, for example, favorable future prospects. On the other hand, the relation might also be attributable to periodic industry-wide overvaluation that is then capitalized by several firms. In contrast, firm-specific issuance history seems to have no predictive power. Following Fama and French (2005), I would have expected that firms having made an equity issue during the last years are more likely to issue equity again.

Chang et al. (2006) suggest that only certain illiquid and less followed firms associated with severe uncertainty are able to take advantage of overvaluation. This view is supported by the observed negative relation between share turnover and the probability of equity offering. Stock return volatility, on the other hand, is associated with a positive coefficient, which implies that riskier firms are more likely to issue public equity. It is natural because, most often, young

growth firms are regarded as the most risky investments. Finally, the positive coefficient related to the stock price run-up during the last three years provides further support to the hypothesis about market timing. At the same time, it highlights the possibility that pseudo market timing might actually be a valid consideration.

7.1.3 Size of equity issue

Analysis of the size of equity offering is extremely interesting because the empirical literature examining the issue size is virtually nonexistent. To my knowledge, the studies of Hovakimian et al. (2001) and Chang et al. (2006) are the only papers that provide a thorough analysis of the factors affecting the size of seasoned equity offering. The lack of interest in the issue size is somewhat surprising because the main theories of financing decisions are associated with distinct predictions about factors affecting the size of equity offering. According to the market timing theory, managers issue overvalued equity to create wealth for the long-term shareholders. If market timing behavior was the most important element behind issuances, we should expect to observe a positive relation between overvaluation and the issue size because the benefit for the long-term shareholders obviously increases with the issue size. On the other hand, if equity issuance activity is mostly driven by future investments, the greater investment opportunities can be expected to result in larger issues.

Table 8 presents the average size of equity offering separately for groups formed on firm-specific error and long-term value-to-book. It seems that the issue size is affected by both misvaluation and investment opportunities. However, the relation between firm-specific error and issuance size is somewhat weak, whereas the impact of long-term value-to-book on the size of equity offering is exceptionally significant. Overall, the findings presented in Table 8 suggest that at least investment opportunities motivate equity offerings and affect the issuance process.

Table 8: Size of seasoned equity offering

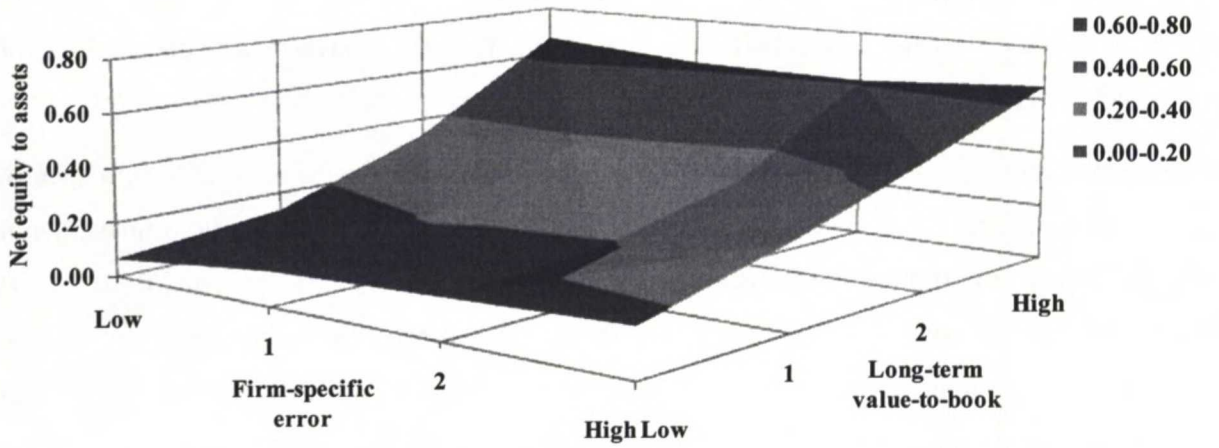
The table reports the average size of seasoned equity offering for subsamples formed on median firm-specific error and long-term value-to-book. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Size of issue refers to the net equity issued scaled by the total assets. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *z* and *t* statistics for the test that medians and means, respectively, are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	Firm-specific error				Long-term value-to-book			
	Low	High	Difference	*z, t*	Low	High	Difference	*z, t*
Median issue size	0.27	0.28	0.01*	1.90	0.13	0.41	0.28***	15.52
Mean issue size	0.32	0.36	0.04**	2.02	0.17	0.50	0.34***	19.43

To further investigate the effect of misvaluation and investment opportunities on the size of equity offerings, I tabulate the average issue size across firm-specific error and long-term value-to-book quartiles. Figure VI displays the results as a three-dimensional graph. In accordance with the results of Table 8, the relation of long-term value-to-book to the issue size seems much stronger than the one of firm-specific error. Despite the fact that the pattern in Figure VI is especially telling, there are at least two caveats with respect to the findings in this section. Firstly, the findings can be regarded robust only after controlling for other potential determinants of the issue size as it is obvious that also other factors contribute to the relative issue size. Secondly, and more importantly, the observed statistically significant impacts of firm-specific error and long-term value-to-book on the likelihood of equity offerings might seriously affect the empirical analysis of factors affecting the issuance size. This well-known endogeneity problem might result in biased estimates. Thus, further examination is essentially important.

Figure VI: Average issue size across market-to-book component quartiles

The figure presents the average issue size across firm-specific error and long-term value-to-book quartiles. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Size of issue refers to the net equity issued scaled by the total assets. The data points are based on the average size of seasoned equity offerings in each quartile.



Following Hovakimian et al. (2001) and Chang et al. (2006), I control the relation of firm-specific error and long-term value-to-book to the issue size for the possible effects of internally available funds and debt capacity. Tangibility is used as a measure of debt capacity, whereas return on assets, actual future cash flow, projected future cash flow, and relative cash balance act as proxies for the availability of internal financing. Table 9 reports the results of standard OLS regression, in which the dependent variable is the scaled size of equity issue. In general, the

results are in line with the implications based on the univariate analysis. The size of equity offering increases with both firm-specific error and long-term value-to-book, and especially the effect of long-term value-to-book on the size is remarkably strong. The explanatory power of market-to-book ratio, on the other hand, is insignificant. Tangibility, that is associated with high debt capacity, affects the issue size negatively, as expected. All the variables that are likely to proxy for the availability of internal financing are associated with a negative coefficient. Furthermore, the negative effects of projected future cash flow and relative cash balance on the issue size are statistically significant. Compared with the findings of Hovakimian et al. (2001) and Chang et al. (2006), the impact of internal funds, as well as debt capacity, on the issue size is similar. Goodness of fit, on the other hand, is significantly higher with my specification. For example, Chang et al. (2006) report an R^2 of 0.25. Thus, the OLS regression provides formal support to the conclusion made above: misvaluation and investment opportunities have a considerable impact on the issuance process.

Table 9: OLS regression: Determinants of issue size

The table reports the regression coefficients and corresponding test statistics for the sample of seasoned equity offerings. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. The dependent variable is the firm size scaled size of seasoned equity offering which is calculated by dividing the net equity issued by the total assets. Firm-specific error and long-term value-to-book are highlighted with grey color. Market-to-book is simply the ratio of stock price to the book value per share. Tangibility is defined as the ratio of property, plant and equipment (PPE) to total assets. Return on assets (ROA) is calculated by dividing the net income by total assets. Actual future cash flow is the sum of actual future free cash flows for the following three-year period. Projected future cash flow is the product of average free cash flow growth rate over the previous three years and the previous year's actual free cash flow. Relative cash balance is the ratio of cash and cash equivalents to industry-specific median cash and cash equivalents where cash and cash equivalents are scaled by total assets. Test statistics reported in parentheses next to regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

	Dependent variable: Firm size scaled issue size	
	OLS regression	
Independent variables	Coefficient	*t*
Firm-specific error	0.08 ***	(4.37)
Long-term value-to-book	0.21 ***	(11.74)
Market-to-book	0.22	(1.52)
Tangibility	-0.10 ***	(-2.85)
Return on assets	-0.09	(-1.58)
Actual future cash flow	-0.10	(-1.51)
Projected future cash flow	-0.00 ***	(-4.74)
Relative cash balance	-0.01 ***	(-3.43)
Constant term	yes	
Year fixed effect	yes	
Industry fixed effect	yes	
Number of observations	1 707	
p-value (F-test)	0.00	
R^2	0.42	

As discussed above, the decision about equity issuance is an endogenous choice. Therefore, the OLS regression presented in Table 9 is estimated only over the firm-years in which an equity issue decision is observed and as a result, the results could be biased. Indeed, the possibility of

bias is significant because the variables of interest, firm-specific error and long-term value-to-book, are statistically significantly related to the probability of observing an equity issue, that is, the likelihood of seasoned equity offerings as shown in Table 7. Thus, the statistically significant relations observed empirically might actually be spurious. Also Chang et al. (2006) acknowledge the endogeneity problem and employ Heckman selection model to alleviate the bias. Hovakimian et al. (2001), however, do not account for the problem in any way. To mitigate the potential problems, I employ more sophisticated econometric models of self-selection in addition to the standard OLS. Firstly, following Chang et al. (2006), I re-estimate the regression presented in Table 9 as part of Heckman selection model. Secondly, I use multivariate multinomial logit regression model to investigate the factors that cause firms to make a large issue instead of a smaller one. Table 10 reports the results. Selection equation of Model I, as well as the specifications of multinomial Models IIa and IIb, is based on the standard logit model of issuance decision introduced in Table 7. The regression equation of Heckman selection model, on the other hand, is directly comparable to the OLS specification presented in Table 9.

Table 10: Heckman selection and multinomial logit regressions: Determinants of issue size

The table reports the regression coefficients and corresponding test statistics, as well as marginal effects, for the sample of seasoned equity offerings. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. For Heckman selection model (Model I), the dependent variable is the firm size scaled size of seasoned equity offering which is calculated by dividing the net equity issued by the total assets. For multinomial logit regressions (Models IIa and IIb), the dependent variable equals 1 in case of large seasoned equity offering, 2 in case of small seasoned equity offering, and 3 otherwise. Large equity issue corresponds to transactions in which the net equity issued exceeds 10 % of the total assets at the end of the previous year. Small equity issue corresponds to transactions in which the net equity issued lies between 0.5 % and 10 % of the total assets at the end of the previous year. The base category is small seasoned equity offerings. Only the comparison between small and large offerings is reported. Thus, the coefficients of multinomial logit models indicate the effect of a variable on the probability of large issuance relative to a small one. Firm-specific error and long-term value-to-book are highlighted with grey color. Assets is the natural logarithm of the total assets. Tangibility is defined as the ratio of property, plant and equipment (PPE) to total assets. Deviation from target leverage is calculated by dividing the actual book leverage by the target leverage estimated through industry-specific OLS model. Z-score refers to the standard Altman's Z-score. R&D expenses denotes to the size scaled research and development expenditure. Dividends is the ratio of total cash dividends to total assets. Total discretionary accruals is difference between total accruals and non-discretionary accruals which are estimated through two-step OLS procedure. Equity issuance activity refers to the industry-specific annual frequency of seasoned equity offerings. Past equity issues is the firm-specific size scaled sum of proceeds from equity offerings made during the period of past three years. Market-to-book is simply the ratio of stock price to the book value per share. Share turnover denotes to the ratio of annual trading volume to total number of shares outstanding. Stock price run-up is the change in stock price during the previous three year. Stock return volatility is the standard deviation of daily stock returns during the previous year. Earnings volatility is defined as the standard deviation of operating income during the period of past five years. Return on assets (ROA) is calculated by dividing the net income by total assets. Actual future cash flow is the sum of actual future free cash flows for the following three-year period. Projected future cash flow is the product of average free cash flow growth rate over the previous three years and the previous year's actual free cash flow. Relative cash balance is the ratio of cash and cash equivalents to industry-specific median cash and cash equivalents where cash and cash equivalents are scaled by total assets. Bootstrapping estimation is based on 500 replications. Test statistics reported in parentheses next to regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

		Heckman selection model			Multinomial logit regression: Large vs. small equity offerings				
		Model I: Maximum likelihood estimation			**Model IIa: Maximum likelihood estimation**			**Model IIb: Bootstrapping**	
Independent variables		Coefficient	*t*		Coefficient	*z*	Marginal effect	Coefficient	*z*
Firm-specific error	Selection equation	0.19 ***	(5.59)		-0.13	(-0.71)	0.15 %	-0.13	(-0.74)
Long-term value-to-book		0.09 **	(2.09)		1.18 ***	(5.73)	0.31 %	1.18 ***	(4.97)
Assets		0.07 ***	(4.90)		-0.45 ***	(-7.66)	0.03 %	-0.45 ***	(-6.86)
Tangibility		0.23 *	(1.87)		0.78	(1.26)	0.50 %	0.78	(1.18)
Deviation from target leverage		-0.02 *	(-1.70)		-0.13 **	(-2.21)	-0.02 %	-0.13 *	(-1.80)
Z-score		-0.06 ***	(-3.16)		0.12	(1.57)	-0.03 %	0.12	(1.25)
R&D expenses		0.06 ***	(3.47)		-0.13	(-1.19)	0.06 %	-0.13	(-0.12)
Dividends		-16.20 ***	(-6.51)		-41.58 ***	(-2.62)	-34.00 %	-41.58 ***	(-2.71)
Total discretionary accruals		1.38 ***	(6.58)		2.68	(1.64)	1.82 %	2.68	(1.54)
Equity issuance activity		0.02 ***	(7.06)		-0.02	(-0.81)	0.02 %	-0.02	(-0.81)
Past equity issues		0.01	(0.30)		-0.31 **	(-2.38)	0.00 %	-0.31	(-1.50)
Market-to-book		-0.01	(-0.58)		0.20	(1.28)	-0.01 %	0.20	(1.17)
Share turnover		-0.02 ***	(-3.21)		0.02	(0.46)	-0.02 %	0.02	(0.46)
Stock price run-up		0.56 ***	(7.33)		-0.38	(-0.68)	0.71 %	-0.38	(-0.64)
Stock return volatility		0.61 ***	(2.66)		2.42 *	(1.86)	0.88 %	2.42 **	(2.05)
Earnings volatility		-0.16	(-1.60)		-0.15	(-0.22)	-0.27 %	-0.15	(-0.08)
Firm-specific error	Regression equation	0.06 **	(2.14)						
Long-term value-to-book		0.21 ***	(7.77)						
Market-to-book		0.22	(1.36)						
Tangibility		-0.18 ***	(-2.64)						
Return on assets		-0.11 *	(-1.74)						
Actual future cash flow		-0.20 **	(-2.43)						
Projected future cash flow		-0.00 ***	(-3.52)						
Relative cash balance		-0.00 *	(-1.73)						
Constant term		yes			yes			yes	
Year fixed effect		yes			yes			yes	
Industry fixed effect		yes			yes			yes	
Number of observations		24 367			24 215			24 215	
X^2		499.20			10 224.22			3281.74	
p-value (X^2)		0.00			0.00			0.00	
pseudo-R^2		-			0.15			0.15	

As we are able to observe, the relation of long-term value-to-book to the issue size remains strongly significant also with the econometric models that account for the possible endogeneity. However, the impact of firm-specific error on the issue size becomes questionable. Model I in

Table 10, that is, Heckman selection model, presents a weak but still statistically significant positive relation, with *t* statistic being 2.14. On the other hand, the coefficient related to firm-specific error is highly significant in the selection equation, which mirrors the highly significant coefficient in the logit model of issuance decision presented in Table 7. As a result, it is very likely that the strong relation between misvaluation and the issue size indicated by the standard OLS regression in Table 9 is, at least partly, affected by the fact that misvaluation is a consequential element behind the issuance decision. Considering the control variables, the coefficients in the selection equation and regression equation are directly comparable to those presented in Tables 7 and 9, respectively. The weak relation between the firm-specific error and issue size is inconsistent with the analysis of Hovakiam et al. (2001). Namely, they find that market-to-book ratio and two-year excess stock returns have a significant effect on the size of seasoned equity offering. However, the finding of Hovakimian et al. (2001) might be, at least partly, driven by the discussed endogeneity problem as they employ only standard OLS regressions.

Models IIa and IIb in Table 10 present even more apparent results. The multinomial logit models, employing small issues as base category, present a comparison between the determinants of large and small equity issues. It seems that the explanatory power of firm-specific error over the likelihood of making a large issue relative to smaller one is statistically insignificant. Moreover, somewhat surprisingly, the coefficient has a negative sign. On the other hand, what comes to long-term value-to-book, it seems to be one of the most significant factors increasing the probability of large issuance. In fact, only the firm size has a stronger impact. As one might expect, smaller firms are more likely to make relatively larger equity offerings. However, the results of Models IIa and IIb should be interpreted somewhat carefully because the division of issues into large and small ones is naturally fairly rough. Specifically, large equity issue corresponds to transactions in which the net equity issued exceeds 10 % of total assets, whereas small equity issue are transactions in which the net equity issued lies between 0.5 % and 10 % of total assets. It also seems that the bootstrapping clearly adds value as the model structure becomes more complicated. For example, maximum likelihood estimation and bootstrapping yield remarkably different standard error estimates regarding the past equity issues. I believe the bootstrapping standard error to be more reliable because of striking nonnormality associated with the distribution of past equity issues.

The strong relation between long-term value-to-book and issue size highlights the role of investment opportunities as a motivation for equity issues. In addition, misvaluation seems to affect the issue size to some degree, which especially together with the findings based on the logit models in Table 7 supports the view that also market timing has elements of truth. On the other hand, the observed weak relation between misvaluation and the size of equity offering is somewhat disturbing in terms of market timing being the stand-alone motivation behind financing decision. It is, in fact, interesting that managers do not capitalize on overvalued stock prices by increasing the issue size considerably even though they seem to take the relative valuation into consideration otherwise. Firstly, managers might acknowledge the possibility that investors discount the stock price substantially if firms announce large offerings without proper justifications. The results of Masulis and Korwar (1996), Korajczyk et al. (1990), and Bayless and Chaplinsky (1996) showing that the price drop at announcement increases with the issue size are consistent with this view. Secondly, corporate control systems might affect the managers' ability to exaggerate the size of offering when the risks of managerial discretion, misuse of proceeds, and value destruction are significant. The lack of sensible investment opportunities clearly increases these risks. Furthermore, the constraint related to control systems might realistically affect my results because external shareholder protection, corporate governance, and capital market regulation are relatively effective in the USA (e.g. Guenther and Young (2000)).

7.1.4 Usage of proceeds

The examination of uses of proceeds is an extremely interesting topic to be included in my thesis because of two reasons. Firstly, it provides a testing ground for the validity of the decomposition of market-to-book ratio. If long-term value-to-book truly measures investment opportunities, one would expect to observe a positive relation between it and certain accounting items depicting investment activities, such as capital expenditures and research and development. Secondly, information about uses of proceeds deepens the understanding of motivations for equity offerings. Finally, the rareness of thorough documentation about the effects of equity issuance on the post-issue business operations in the prior literature makes the following presentation highly interesting. As Kim and Weisbach (2007) point out, the literature is remarkably silent on the fundamental question underlying equity issues: How is the money raised in the seasoned equity offerings used by the firms? The univariate analyses of post-issue increases in assets and expenditures, as well as the OLS regression experiment, closely mirror those of Hertzel and Li

(2007). Compared to their methodology, the most important differences in the following presentation are the division between non-high-tech and high-tech firms, and the inclusion of dividend payout into the analysis.

Following the approach of Hertzel and Li (2007) and Kim and Weisbach (2007), I begin the analysis of uses of proceeds in a univariate setting. Table 11 reports the mean development for each accounting variable for groups formed on firm-specific error and long-term value-to-book. I examine the development over a post-issue period of one to five years. Specifically, the accounting variables of interest are the cumulative investments in research and development, capital expenditures, long-term debt reductions, dividend payments, and acquisitions, as well as cumulative changes in inventories, cash and cash equivalents, and total assets. Or, that is to say

$$Y_{ij} = \ln\left[\left(\frac{\sum_{t=1}^{T} V_t}{Assets_0}\right)+1\right], \tag{23}$$

where Y_{ij} is the change in accounting item i for a period of j years after the offering, and V_t refers to research and development, capital expenditures, reduction in long-term debt, dividends or acquisitions during year t. Similarly, in case of cash and cash equivalents, inventory, and total assets, that are denoted by V_t, the development in an accounting variable i is measured by

$$Y_{ij} = \ln\left[\left(\frac{V_t}{Assets_0}\right)+1\right]. \tag{24}$$

Furthermore, I study non-high-tech and high-tech[34] firms separately. I expect this to increase the reliability of results because the business logics and accounting policies are significantly more coherent among the subsamples relative to the entire sample. Moreover, the cross-sectional variation in the variables decreases considerably as the high-tech based division is implemented. Thus, the separate analysis of high-tech and non-high-tech observations seems well justified.

[34] The division between non-high-tech and high-tech firms is made on the grouds of Thomson Financial SDC Platinum database's business description that is available for most U.S. issuers.

Table 11: Post-issue increases in expenditures and assets

The table reports the average post-issue development in accounting variables for subsamples formed on median firm-specific error and long-term value-to-book. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The development in accounting variables is observed for the one-year to five-year post-issue periods. The variables of interest are the cumulative investments in research and development, capital expenditures, long-term debt reductions, dividend payments, and acquisitions, as well as cumulative changes in inventories, cash and cash equivalents, and total assets. The accounting variables are scaled to total assets at the end of the previous fiscal year before the offering. High-tech firms and non-high-tech firms are shown separately. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *t* statistics for the test that means are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

		Non-high-tech firms								High-tech firms							
		Firm-specific error				Long-term value-to-book				Firm-specific error				Long-term value-to-book			
	Post-issue period	Low	High	Difference	*t*	Low	High	Difference	*t*	Low	High	Difference	*t*	Low	High	Difference	*t*
Σ R&D	1	0.01	0.01	-0.00	-1.08	0.00	0.01	0.00**	2.13	0.09	0.07	-0.02***	-4.52	0.04	0.11	0.07***	13.74
	2	0.02	0.01	-0.00	-1.17	0.01	0.02	0.01**	2.44	0.18	0.14	-0.04***	-4.39	0.09	0.22	0.13***	14.20
	3	0.02	0.02	-0.01	-1.16	0.01	0.02	0.01**	2.30	0.27	0.21	-0.06***	-4.26	0.14	0.33	0.19***	14.20
	4	0.03	0.02	-0.01	-1.08	0.02	0.03	0.012**	2.17	0.34	0.26	-0.08***	-4.37	0.19	0.42	0.23***	13.63
	5	0.03	0.03	-0.01	-1.06	0.02	0.04	0.01**	2.04	0.41	0.32	-0.09***	-4.18	0.23	0.49	0.27***	13.01
Σ CAPEX	1	0.09	0.09	-0.00	-0.53	0.07	0.10	0.03***	6.22	0.05	0.06	0.01	1.56	0.06	0.04	-0.02***	-5.27
	2	0.19	0.18	-0.01	-1.35	0.15	0.23	0.07***	7.39	0.11	0.12	0.01	1.20	0.13	0.11	-0.02***	-3.43
	3	0.29	0.27	-0.02	-1.37	0.22	0.34	0.11***	7.56	0.18	0.18	0.00	0.33	0.19	0.17	-0.03***	-2.79
	4	0.36	0.34	-0.03	-1.43	0.28	0.43	0.14***	7.78	0.23	0.23	0.00	0.11	0.25	0.22	-0.03**	-2.21
	5	0.43	0.40	-0.03	-1.56	0.33	0.51	0.17***	7.95	0.27	0.27	0.01	0.32	0.29	0.26	-0.03**	-2.26
Σ LT debt reduction	1	0.11	0.13	0.02**	2.16	0.13	0.10	-0.03***	-3.78	0.04	0.06	0.02***	3.47	0.07	0.03	-0.04***	-6.99
	2	0.20	0.24	0.03**	2.29	0.25	0.19	-0.05***	-3.62	0.08	0.11	0.03***	2.68	0.12	0.06	-0.07***	-7.04
	3	0.28	0.33	0.06***	2.81	0.34	0.27	-0.08***	-3.92	0.12	0.15	0.03**	2.51	0.18	0.08	-0.09***	-7.76
	4	0.36	0.41	0.06**	2.32	0.42	0.35	-0.07***	-3.09	0.16	0.19	0.03*	1.83	0.23	0.11	-0.12***	-8.21
	5	0.42	0.48	0.05*	1.92	0.49	0.42	-0.07***	-2.66	0.20	0.22	0.03	1.38	0.28	0.13	-0.15***	-8.35
Σ Dividends	1	0.01	0.00	-0.00***	-2.78	0.01	0.00	-0.00***	-4.37	0.00	0.00	-0.00**	-2.48	0.00	0.00	-0.00***	-2.75
	2	0.01	0.01	-0.00***	-3.00	0.01	0.01	-0.00***	-3.76	0.00	0.00	-0.00***	-2.74	0.00	0.00	-0.00***	-3.63
	3	0.02	0.01	-0.01***	-2.75	0.02	0.01	-0.01***	-3.08	0.01	0.00	-0.00***	-2.62	0.01	0.00	-0.01***	-4.22
	4	0.03	0.02	-0.01***	-2.73	0.03	0.02	-0.01***	-2.78	0.01	0.00	-0.00***	-2.32	0.01	0.00	-0.01***	-4.27
	5	0.03	0.02	-0.01***	-2.85	0.03	0.02	-0.01***	-2.65	0.01	0.01	-0.01**	-2.52	0.01	0.00	-0.01***	-4.57
Σ Acquisitions	1	0.04	0.05	0.01	1.64	0.05	0.03	-0.02***	-3.54	0.03	0.03	0.01	1.33	0.04	0.02	-0.03***	-6.58
	2	0.08	0.10	0.02**	2.30	0.10	0.09	-0.01	-1.26	0.07	0.07	0.01	1.07	0.09	0.05	-0.04***	-5.14
	3	0.11	0.14	0.04***	2.89	0.13	0.12	-0.01	-0.66	0.11	0.12	0.01	0.88	0.13	0.09	-0.05***	-4.02
	4	0.13	0.18	0.04***	2.81	0.16	0.16	-0.00	-0.29	0.14	0.15	0.02	1.03	0.17	0.12	-0.05***	-3.68
	5	0.16	0.21	0.05***	2.68	0.19	0.18	-0.01	-0.41	0.17	0.18	0.02	1.05	0.21	0.15	-0.05***	-3.23
Δ Cash	1	0.04	0.04	0.01	0.83	0.02	0.07	0.05***	7.18	0.12	0.16	0.04***	3.52	0.13	0.18	0.05***	4.70
	2	0.05	0.07	0.01	1.10	0.03	0.10	0.07***	7.09	0.21	0.21	-0.00	-0.08	0.16	0.29	0.14***	7.57
	3	0.05	0.06	0.00	0.40	0.03	0.08	0.05***	4.57	0.19	0.19	-0.00	-0.19	0.14	0.26	0.13***	6.07
	4	0.05	0.04	-0.01	-0.70	0.02	0.08	0.06***	4.69	0.15	0.19	0.04	1.60	0.14	0.22	0.08***	3.25
	5	0.06	0.04	-0.02	-1.16	0.02	0.08	0.07***	5.02	0.11	0.17	0.06**	1.98	0.14	0.16	0.03	0.80
Δ Inventory	1	0.03	0.03	-0.00	-0.59	0.03	0.03	0.01**	2.36	0.02	0.02	0.01***	2.96	0.03	0.01	-0.01***	-6.08
	2	0.07	0.06	-0.00	-0.52	0.05	0.08	0.03***	3.98	0.04	0.04	0.01	1.08	0.05	0.04	-0.01***	-2.80
	3	0.09	0.08	-0.01	-0.72	0.07	0.11	0.04***	4.43	0.06	0.06	0.00	0.08	0.06	0.05	-0.01	-1.60
	4	0.10	0.09	-0.01	-0.51	0.07	0.12	0.05***	4.66	0.06	0.06	-0.00	-0.35	0.07	0.05	-0.02**	-2.28
	5	0.10	0.09	-0.01	-0.56	0.06	0.13	0.07***	5.30	0.06	0.06	0.00	0.07	0.07	0.05	-0.02**	-2.06
Δ Assets	1	0.21	0.23	0.02**	1.99	0.19	0.25	0.06***	4.89	0.23	0.32	0.09***	6.72	0.29	0.29	-0.00	-0.20
	2	0.38	0.42	0.04*	1.90	0.32	0.49	0.17***	8.76	0.44	0.49	0.04*	1.85	0.44	0.52	0.08***	3.50
	3	0.43	0.46	0.03	0.95	0.36	0.56	0.19***	5.53	0.47	0.49	0.02	0.44	0.47	0.52	0.05	1.58
	4	0.42	0.41	-0.02	-0.37	0.33	0.53	0.21***	4.00	0.43	0.47	0.04	0.80	0.45	0.48	0.03	0.69
	5	0.37	0.33	-0.04	-0.54	0.22	0.51	0.29***	4.43	0.37	0.43	0.06	0.99	0.41	0.42	0.01	0.15

Results in Table 11 highlight several interesting relations. In general, the results are similar to those presented by Hertzel and Li (2007). Firstly, research and development and capital expenditures with non-high-tech firms, as well as research and development with high-tech firms,

are strongly positively related to long-term value-to-book. In contrast, especially with non-high-tech firms, such a relation is not observed when investing activities are examined across groups formed on firm-specific error. Furthermore, changes in cash, inventory, and total assets are positively related to long-term value-to-book in case of non-high-tech firms. Therefore, as expected, it seems that favorable investment opportunities are associated with actual post-issue investments and faster growth. These findings are also consistent with the interpretation of long-term value-to-book as a measure of investment opportunities.

Consistent with the view that firm-specific error reflects misvaluation, I find that high firm-specific error firms are more likely to spend the issue proceeds on debt reductions. As a sharp contrast, it seems that high long-term value-to-book firms, in fact, raise additional debt financing. Similarly, DeAngelo et al. (2007) report that a considerable fraction of firms decreased the debt obligations significantly after the offering. In addition, according to the study of Kim and Weisbach (2007), some firms spend a significant fraction of proceeds on long-term debt reductions. However, the very same papers show also that, in case of most issuers, debt reductions are not the reason behind seasoned equity offering. Namely, both Kim and Weisbach (2007) and DeAngelo et al. (2007) show that about half of the issuers in their samples increased their debt around the time of seasoned equity offering.

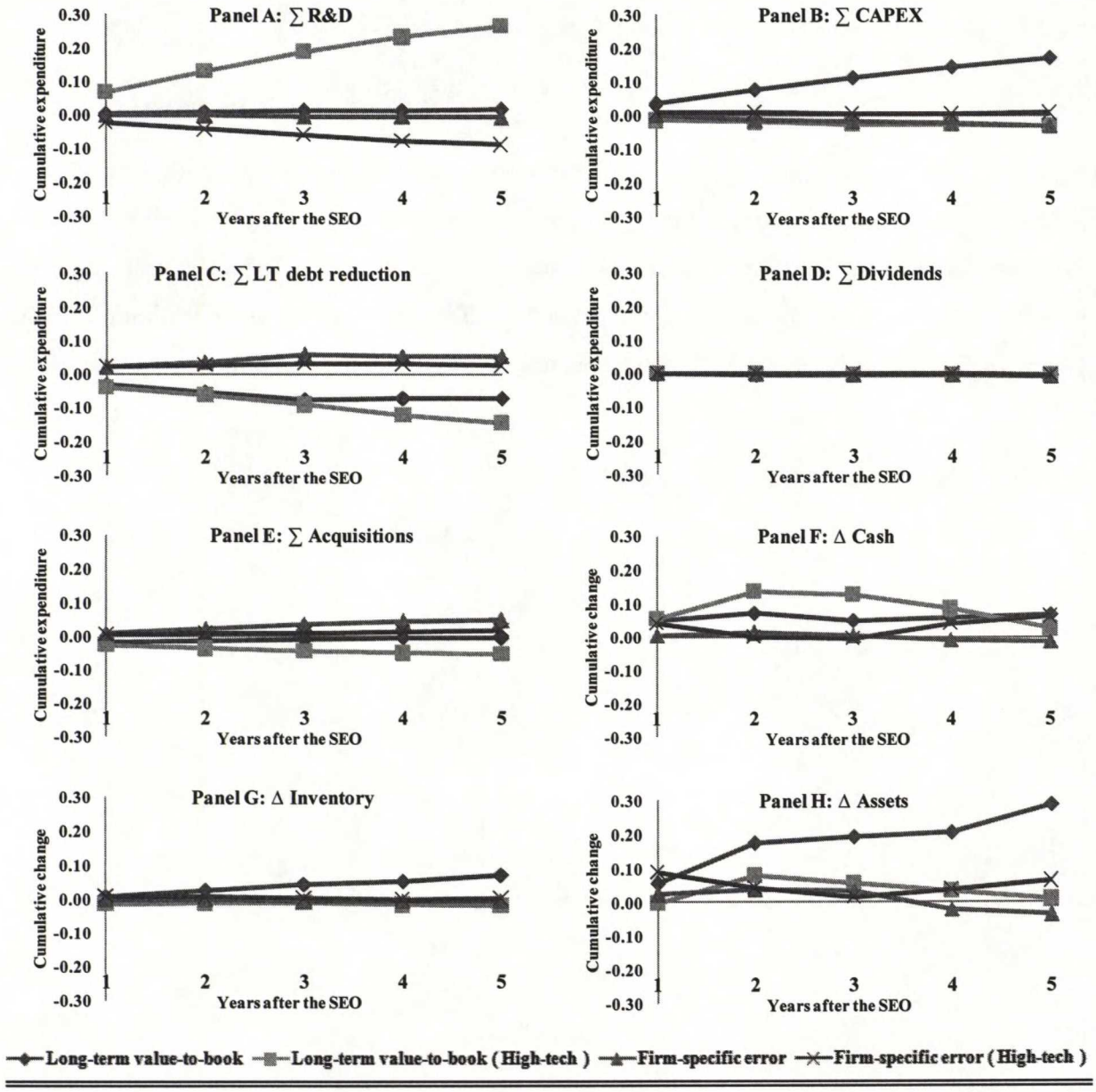
Firm-specific error is also positively related to acquisitions in case of non-high-tech firms. This is perhaps caused by the lack of organic growth prospects and the exploitation of favorable stock valuation in the spirit of the stock market driven acquisitions model by Schleifer and Vishny (2003). In addition, Kim and Weisbach (2007) report that the post-issue change in cash and cash equivalents is positively related to Tobin's Q and market-to-book, their proxies for misvaluation. This pattern is not observed in my analysis where firm-specific error is used as a proxy for mispricing. Finally, it is important to note that the discussed findings are potentially affected by the failure of univariate statistics to control adequately for other significant factors.

Figure VII presents the information of Table 11 in a graphical format to improve the readability and clarity. In short, research and development and capital expenditures appear to be important considerations for firms with favorable investment opportunities as Panels A and B in Figure VII suggest. Panel C, on the other hand, indicates that overvalued firms use relatively cheaper equity to substitute for debt, whereas firms with favorable investment opportunities seem to raise

supplemental debt concurrently with equity. Panel E illustrates the positive relation between pre-issue misvaluation and subsequent acquisition activity. Finally, Panels G and H in Figure VII indicate that favorable investment opportunities facilitate growth, as one might reasonably expect. Interpretations are less distinct in case of the rest accounting variables presented in Figure VII, that is, Panels D and F.

Figure VII: Post-issue increases in expenditures and assets

The figure presents the average development in accounting variables during the post-issue period of five years. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The data points are based on the difference between the subsamples formed on the median firm-specific error and long-term value-to-book. The average value of below-median subsample is subtracted from the average value of above-median subsample. The variables of interest are the cumulative investments in research and development, capital expenditures, long-term debt reductions, dividend payments, and acquisitions, as well as cumulative changes in inventories, cash and cash equivalents, and total assets. The accounting variables are scaled to total assets at the end of the previous fiscal year before the offering. High-tech firms and non-high-tech firms are shown separately. Subsample breakpoints are formed using the sample of seasoned equity offerings.



To formally estimate the uses of the capital raised in the seasoned equity offering, I rely on the specification of Kim and Weisbach (2007) that is also employed by Hertzel and Li (2007). The model enables primary capital, secondary capital, and internally generated funds to enter the regression separately. In addition to the standard specification of Kim and Weisbach (2007), firm-specific error and long-term value-to-book are included as explanatory variables. Moreover, I include total assets as a control for size, and high-tech dummy as a control for possible differences in accounting policies and business logics. Logarithms are used to minimize the effect of outliers. The dependent variables are identical to those employed in the univariate analysis, that is, Equations 23 and 24. Specifically, I estimate the following model

$$Y_{ij} = \beta_0 + \beta_1(Firm-specific \quad error) + \beta_2(Long-term \quad value-to-book) + \beta_3 \ln\left[\left(\frac{\text{Pr}imary \quad capital}{Assets_0}\right)+1\right] + \beta_4 \ln\left[\left(\frac{Secondary \quad capital}{Assets_0}\right)+1\right] + \beta_5 \ln\left[\left(\frac{Internal \quad funds}{Assets_0}\right)+1\right] + \beta_6 \ln(Assets_0) + \beta_7(High-tech) + \varepsilon, \quad (25)$$

where Y_{ij} refers to the cumulative investments in research and development, capital expenditures, long-term debt reductions, dividend payments, and acquisitions, as well as cumulative changes in inventories, cash and cash equivalents, and total assets over the period of j years after the offering. Except for the high-tech dummy, Equation 25 is similar to the specification of Hertzel and Li (2007). Table 12 presents the regression results based on Equation 25.

Table 12: OLS regression: Usage of proceeds

The table reports the regression coefficients and corresponding test statistics for the sample of seasoned equity offerings. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. Specifically, the results are based on regression Equation 25. The dependent variables are the cumulative investments in research and development, capital expenditures, long-term debt reductions, dividend payments, and acquisitions, as well as cumulative changes in inventories, cash and cash equivalents, and total assets. The development in accounting variables is observed for the one-year to five-year post-issue periods. The accounting variables are scaled to total assets at the end of the previous fiscal year before the offering. Firm-specific error and long-term value-to-book are highlighted with grey color. Primary capital and secondary capital refer to the proceeds from the issued primary and secondary shares, respectively. Other capital is the sum of operating, investment, and financing cash flows less the primary capital. Total assets refers to the book value of assets. For primary, secondary, and other capital, as well as total assets, natural logarithm is used to avoid the impact of outliers. High-tech dummy equals 1 in case of high-tech issuers, and 0 otherwise. Test statistics reported in parentheses next to regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

Dependent variable: ∑R&D, ∑CAPEX, ∑LT debt reduction, ∑Dividends, ∑Acquisitions, ΔCash, ΔInventory, ΔAssets																	
OLS regression																	
	Post-issue period	Firm-specific error		Long-term value-to-book		Primary capital		Secondary capital		Other capital		Total assets		High-tech dummy		R^2	N
∑ R&D	**1**	-0.01***	(-2.72)	0.04***	(8.53)	0.00	(0.37)	-0.03***	(-3.96)	-0.00	(-0.23)	-0.00	(-1.47)	0.03***	(5.79)	0.41	2 067
	2	-0.01***	(-2.70)	0.07***	(8.46)	0.02	(1.02)	-0.06***	(-3.85)	0.01	(1.03)	-0.00*	(-1.82)	0.05***	(6.16)	0.44	2 068
	3	-0.01**	(-2.55)	0.09***	(8.37)	0.04	(1.62)	-0.08***	(-3.73)	0.03***	(2.71)	-0.01	(-1.43)	0.08***	(6.53)	0.47	2 069
	4	-0.02**	(-2.54)	0.10***	(7.87)	0.03	(1.21)	-0.11***	(-3.86)	0.05***	(4.55)	-0.01	(-1.55)	0.1***	(6.79)	0.47	2 069
	5	-0.02***	(-2.63)	0.10***	(7.44)	0.03	(0.93)	-0.13***	(-3.92)	0.07***	(5.65)	-0.01	(-1.57)	0.13***	(7.15)	0.49	2 070
∑ CAPEX	**1**	0.00*	(1.81)	0.02***	(5.19)	-0.03***	(-5.29)	-0.01	(-1.58)	0.02***	(5.23)	-0.00**	(-2.49)	-0.01	(-0.90)	0.35	2 067
	2	0.01**	(2.19)	0.04***	(6.27)	-0.06***	(-5.28)	-0.02*	(-1.87)	0.04***	(7.20)	-0.01***	(-3.29)	-0.02	(-1.57)	0.41	2 068
	3	0.01	(1.60)	0.05***	(6.05)	-0.11***	(-5.82)	-0.02	(-1.29)	0.08***	(9.69)	-0.01***	(-3.65)	-0.02	(-1.61)	0.44	2 069
	4	0.01*	(1.85)	0.07***	(6.36)	-0.15***	(-6.80)	-0.03	(-1.08)	0.11***	(11.89)	-0.02***	(-3.99)	-0.03*	(-1.65)	0.46	2 069
	5	0.01*	(1.88)	0.08***	(6.53)	-0.19***	(-7.80)	-0.03	(-1.05)	0.14***	(13.77)	-0.02***	(-4.18)	-0.04*	(-1.80)	0.49	2 070
∑ LT debt reduction	**1**	0.01***	(3.24)	-0.01**	(-2.12)	-0.11***	(-8.38)	-0.04***	(-2.88)	0.13***	(9.69)	-0.01	(-1.63)	-0.03**	(-2.33)	0.25	2 067
	2	0.02***	(3.57)	-0.03***	(-3.42)	-0.24***	(-10.24)	-0.08***	(-3.68)	0.18***	(10.95)	-0.01**	(-2.03)	-0.07***	(-3.68)	0.32	2 068
	3	0.03***	(3.53)	-0.06***	(-4.44)	-0.33***	(-10.57)	-0.11***	(-3.85)	0.22***	(11.56)	-0.02***	(-2.68)	-0.09***	(-3.52)	0.36	2 069
	4	0.03***	(2.78)	-0.08***	(-4.59)	-0.36***	(-9.27)	-0.12***	(-3.62)	0.25***	(12.06)	-0.02**	(-2.44)	-0.11***	(-3.59)	0.38	2 069
	5	0.03**	(2.49)	-0.08***	(-4.61)	-0.39***	(-9.23)	-0.12***	(-3.44)	0.25***	(11.88)	-0.02**	(-2.48)	-0.12***	(-3.45)	0.39	2 069
∑ Dividends	**1**	0.00	(-1.36)	0.00	(1.07)	0.00***	(2.73)	0.00	(1.19)	0.00	(-0.72)	0.00***	(7.80)	-0.00***	(-3.48)	0.28	2 067
	2	-0.00	(-1.58)	0.00	(1.26)	0.00*	(1.85)	0.00	(1.29)	0.00	(0.07)	0.00***	(7.61)	-0.00***	(-4.00)	0.29	2 068
	3	-0.00	(-1.18)	0.00	(1.62)	0.00	(1.63)	0.00	(1.55)	0.00	(0.05)	0.01***	(7.73)	-0.01***	(-4.40)	0.29	2 069
	4	-0.00	(-0.88)	0.01*	(1.83)	0.00	(1.29)	0.00	(1.44)	0.00	(0.35)	0.01***	(7.65)	-0.01***	(-4.32)	0.28	2 069
	5	-0.00	(-1.32)	0.01*	(1.77)	0.00	(1.07)	0.01	(1.48)	0.00	(0.91)	0.01***	(7.78)	-0.01***	(-4.37)	0.30	2 070
∑ Acquisitions	**1**	0.00*	(1.68)	-0.02***	(-5.77)	-0.03***	(-5.17)	-0.02***	(-3.03)	0.06***	(10.60)	-0.00	(-1.09)	-0.01*	(-1.78)	0.23	2 138
	2	0.01*	(1.76)	-0.03***	(-4.47)	-0.06***	(-5.20)	-0.02*	(-1.81)	0.08***	(9.31)	-0.01*	(-1.69)	-0.03**	(-2.43)	0.23	2 140
	3	0.01*	(1.88)	-0.03***	(-3.18)	-0.09***	(-4.99)	-0.02	(-1.30)	0.10***	(9.37)	-0.01	(-1.55)	-0.04*	(-1.94)	0.24	2 141
	4	0.02**	(2.33)	-0.03***	(-2.68)	-0.12***	(-5.28)	-0.02	(-0.97)	0.12***	(9.67)	-0.01*	(-1.70)	-0.03	(-1.31)	0.25	2 141
	5	0.03***	(2.64)	-0.04***	(-2.72)	-0.15***	(-5.42)	-0.02	(-0.58)	0.14***	(10.07)	-0.01*	(-1.82)	-0.02	(-0.88)	0.26	2 142
Δ Cash	**1**	-0.01*	(-1.77)	-0.03***	(-3.38)	0.22***	(14.55)	0.03*	(1.74)	0.04***	(3.19)	-0.00	(-0.99)	0.02***	(2.63)	0.36	2 134
	2	0.09***	(9.23)	0.06***	(4.96)	0.26***	(9.89)	-0.05*	(-1.87)	0.03**	(2.28)	-0.01**	(-2.27)	0.02*	(1.71)	0.39	2 056
	3	0.09***	(7.03)	0.06***	(4.03)	0.16***	(4.97)	-0.03	(-0.85)	0.09***	(6.32)	-0.01**	(-2.33)	0.02	(1.27)	0.35	2 013
	4	0.09***	(6.46)	0.03*	(1.66)	0.09**	(2.55)	-0.05	(-1.24)	0.13***	(8.47)	-0.02***	(-3.12)	0.01	(0.45)	0.36	1 960
	5	0.08***	(5.17)	-0.01	(-0.37)	0.03	(0.63)	-0.03	(-0.55)	0.16***	(9.72)	-0.02***	(-2.93)	-0.02	(-0.65)	0.38	1 915
Δ Inventory	**1**	0.00*	(1.72)	-0.00	(-0.96)	-0.01**	(-2.24)	-0.00	(-0.14)	0.01*	(1.94)	-0.01***	(-6.51)	-0.01	(-1.20)	0.25	2 034
	2	0.01*	(1.93)	0.01*	(1.87)	-0.02**	(-2.53)	0.00	(0.21)	0.01**	(2.27)	-0.01***	(-6.11)	-0.02**	(-2.01)	0.32	1 947
	3	0.01	(1.58)	0.02***	(3.22)	-0.02	(-1.63)	-0.02	(-1.22)	0.02***	(2.90)	-0.01***	(-5.57)	-0.02	(-1.49)	0.32	1 909
	4	0.00	(1.06)	0.02***	(2.62)	-0.02	(-1.65)	-0.02	(-0.97)	0.03***	(4.40)	-0.01***	(-4.79)	-0.02	(-1.40)	0.34	1 865
	5	0.01	(1.52)	0.03***	(3.33)	-0.03	(-1.62)	-0.04*	(-1.86)	0.03***	(4.29)	-0.01***	(-4.28)	-0.01	(-0.84)	0.34	1 822
Δ Assets	**1**	0.02***	(3.59)	-0.07***	(-6.55)	0.19***	(10.21)	0.07***	(3.26)	0.17***	(13.86)	-0.02***	(-4.25)	-0.01	(-0.65)	0.39	2 061
	2	0.00	(0.28)	0.05***	(2.71)	0.25***	(5.52)	-0.02	(-0.55)	0.22***	(11.14)	-0.02**	(-2.54)	-0.02	(-0.96)	0.39	1 968
	3	0.01	(0.62)	0.08***	(3.73)	0.08	(1.55)	-0.07	(-1.30)	0.34***	(14.83)	-0.03***	(-3.79)	-0.04	(-1.06)	0.61	1 927
	4	0.01	(0.75)	0.08***	(3.00)	-0.02	(-0.26)	-0.08	(-1.27)	0.43***	(17.07)	-0.05***	(-4.66)	-0.06	(-1.44)	0.68	1 863
	5	0.03	(1.31)	0.10***	(3.02)	-0.06	(-0.93)	-0.10	(-1.44)	0.46***	(18.02)	-0.06***	(-5.03)	-0.03	(-0.54)	0.73	1 801

Considering Table 12, several results are of interest. Firstly, consistent with the univariate analysis, I find evidence that post-issue investments are positively related to the pre-issue level of investment opportunities. More specifically, for research and development and capital expenditures, the coefficients on long-term value-to-book are positive and significant at all time horizons. Furthermore, long-term value-to-book is, in general, positively related to the changes in working capital and total assets. This is exactly what can be expected. Intensified investing activities result in growing asset base and working capital.

Furthermore, the relation of firm-specific error to the post-issue investments is ambiguous. The weak but positive relation between the error component and capital expenditure suggests that the valuation level could, in fact, affect the investing activities, as suggested by Shleifer and Vishny (2003). According to them, it is possible that overvaluation could cause additional investments as financing becomes available at favorable cost. Secondly, also consistent with the prior analysis, reductions in long-term debt are positively related with firm-specific error but negatively related with long-term value-to-book. As a result, firms with favorable investment opportunities spend a larger fraction of the issue proceeds on investments, and some of these firms even increase their debt obligations to finance the investments. On the other hand, firms with higher valuation errors are more likely to pay down debt. Similarly, the fraction of proceeds kept as cash and cash equivalents increases with firm-specific error. The results are approximately comparable to those of Kim and Weisbach (2007) and Hertzel and Li (2007). All in all, the findings presented in Table 12 bolster that both misvaluation and investment opportunities are important elements behind equity issuance. In addition, decomposition of market-to-book seems to be a valid methodology yielding measures of misvaluation and investment opportunities.

The results of Table 12 arouse further questions regarding the cash holdings and therefore, it is of great interest to take one step further. Firstly, the observed positive relation between firm-specific error and changes in cash and cash equivalents might be attributable to the behavior where entrenched managers of overvalued firms issue equity to create financial slack. On the other hand, it is a possibility that weak pre-issue financial position and liquidity force managers to strengthen the balance sheet by issuing equity as soon as a window of opportunity emerges, which naturally results in the positive relation presented in Table 12. Moreover, what makes the further examination particularly interesting is the fact that there is surprisingly little consensus on

the matter in the prior literature. Namely, DeAngelo et al. (2007) argue that firms conduct seasoned equity offerings to resolve a near-term liquidity squeeze, whereas Zwiebel (1996) advocates the role of managerial entrenchment, and Titman et al. (2004) support the empire-building behavior. Table 13 presents the most important findings based on further examination of pre-issue financial position and liquidity.

Table 13: Pre-issue financial position and liquidity of firms issuing seasoned equity

The table reports an array of average values of well-known financial indicators for subsamples formed on median firm-specific error and long-term value-to-book. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Z-score refers to the standard Altman's Z-score. KZ-score[35] indicates equity dependence. The greater the score, the more dependent the firm is on equity financing. Deviation from target leverage is calculated by dividing the actual book leverage by the target leverage estimated through industry-specific OLS model. Relative cash balance is the ratio of cash and cash equivalents to industry-specific median cash and cash equivalents where cash and cash equivalents are scaled by total assets. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *t* statistics for the test that means are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	Firm-specific error				Long-term value-to-book			
	Low	High	Difference	*t*	Low	High	Difference	*t*
Altman's Z-score	2.41	2.21	-0.20**	-2.51	2.02	2.65	0.63***	8.21
Equity dependence (KZ-score)	0.26	0.56	0.30***	6.05	0.59	0.21	-0.38***	-7.94
Deviation from target leverage	0.8 %	41.0 %	40.2 %***	3.17	49.3 %	-28.4 %	-77.7 %***	-6.32
Relative cash balance	72.0 %	66.4 %	-5.6 %*	-1.88	67.0 %	72.0 %	5.0 %*	1.68

As we are able to see, issuers associated with high firm-specific error tend to have lower cash holdings and Z-score before the issue. Furthermore, they are more levered and dependent on equity financing. These relations are completely reversed if firms are grouped on long-term value-to-book. Thus, it seems that the observed positive relation between firm-specific error and changes in cash and cash equivalents, as well as the positive relation between firm-specific error and reductions in debt, is not caused by managers' aspiration to create financial slack or to invest excessively. In contrast, it seems that firms associated with weak financial position issue seasoned equity to improve their balance sheet and liquidity after perceiving a favorable equity valuation level. Overall, this is consistent with the propositions of DeAngelo et al. (2007). Furthermore, Chang et al. (2006) report results that are in compliance with the findings presented in Table 13. On the other hand, the arguments of Zwiebel (1996) and Titman et al. (2004) are conflicting with my evidence. Overall, it seems that misvaluation as a motivation for seasoned equity offerings becomes more important in case of somewhat distressed firms suffering from

[35] The calculation of KZ-score is based on parameter estimates from Kaplan and Zingales (1997) and Baker et al. (2003). Specifically, KZ-score is calculated as a weighted sum of cash flow, dividends, cash balances, and leverage.

$$KZ-score = -1.002\frac{Cash\ \ flow_t}{Assets_{t-1}} - 39.368\frac{Dividends_t}{Assets_{t-1}} - 1.315\frac{Cash\ \ balances_t}{Assets_{t-1}} + 3.139Leverage_t$$

poor liquidity. In other words, the evidence shows that firms raise equity to obtain some breathing room while managers try to resolve the firm's near-term financial difficulties.

Finally, the intended uses of proceeds disclosed by issuers provide complementary evidence and act as a robustness check. Moreover, the majority of studies examining the usage of proceeds are based on financing announcement reports, that is, the disclosed uses of proceeds. For example, Hansen and Crutchley (1990), Jung et al. (1996) and Akhigbe et al. (1997) report that according to the announcement reports, by far the most important motives for equity offerings are debt reductions and investment financing. Thus, it is of great interest to investigate the stated uses of proceeds between issuer subsamples formed on firm-specific error and long-term value-to-book. Furthermore, the investigation of stated usage of proceeds contributes significantly to the prior literature because the existing evidence is based on samples of a few hundred equity offerings. Extensive sample that I employ in this thesis provides somewhat more reliable results and allows for generalizations. However, the credibility of the disclosed uses as empirical evidence is highly questionable because the majority of issuers report multiple motivations for the issue. In addition, the disclosure around the issuance is highly standardized (Akhigbe et al. (1997)). Table 14 presents a broad classification of disclosed uses of proceeds.

Table 14: Disclosed usage of proceeds

The table describes the disclosure of firms issuing seasoned equity by reporting the relative frequency of the most important uses of proceeds for subsamples formed on median firm-specific error and long-term value-to-book. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and LexisNexis news databases, and the period under review is from 1982 to 2006. For the most part, the information is based on the Thomson Financial SDC Platinum database. LexisNexis news queries are used in case of observations for which the disclosed usage of proceeds is not available in Thomson Financial SDC Platinum. The observations of uses of proceeds and query results are matched with the employed classification through the following keywords: Debt reduction ~ refinance, retire, recapitalization, loan, debt, borrowings, balance sheet, capital structure; Mergers and acquisitions ~ acquisition, M&A, joint venture, investment in other company; Capital expenditures ~ capital expenditures, CAPEX, project financing, investment in fixed assets; Research and development ~ research and development, R&D, development activities, product development; Investments in working capital ~ working capital, working funds, operating funds, liquid assets; Changes in share classes ~ redeem class of shares, repurchase class of shares; and Unclassified and other purposes ~ general corporate purposes. Terms are used separately and in various combinations. Most issuers disclose several uses of proceeds. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *t* statistics for the test that means are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	Firm-specific error				**Long-term value-to-book**			
	Low	High	Difference	*t*	Low	High	Difference	*t*
Debt reduction	24 %	31 %	8 %***	2.90	37 %	16 %	-21 %***	-8.39
Mergers and acquisitions	34 %	31 %	-2 %	-0.75	31 %	33 %	2 %	0.62
Capital expenditures	18 %	16 %	-2 %	-1.01	15 %	19 %	4 %*	1.71
Research and development	23 %	13 %	-10 %***	-4.43	9 %	27 %	17 %***	7.96
Investments in working capital	35 %	33 %	-2 %	-0.74	30 %	37 %	8 %***	2.78
Changes in share classes	5 %	5 %	0 %	-0.14	5 %	5 %	0 %	-0.14
Unclassified and other purposes	77 %	74 %	-3 %	-1.02	67 %	81 %	14 %***	5.63

The overall results are comparable to the prior research. For example, Hansen and Crutchley (1990), studying 364 financing announcement reports, report that 14.3 % of issuers refinance

debt, 30.0 % spend the proceeds on investing activities, and 48.6 % refinance debt and spend on investing activities concurrently. Several years later, Jung et al. (1996) report similar results using a somewhat similar classification and a sample of 168 seasoned equity offerings. In their sample, 29.5 % of firms state that they will refinance long-term debt, 9.6 % will refinance short-term debt, and the remaining 60.9 % of issuers indicate that the primary usage of proceeds is investments in fixed assets and working capital. Considering these earlier studies and the findings presented in Table 14, the fundamental pattern of disclosed motivations is similar, at least in the broader terms.

Considering the differences between subsamples, the evidence in Table 14 is in accordance with the results of univariate analysis and OLS regressions discussed above. Firstly, overvalued firms seem to pursue debt reductions, whereas firms with favorable investment opportunities rarely disclose inclination to deleverage. Secondly, investing activities, that is, capital expenditures, research and development, and investments in working capital, are important motivations for firms with favorable investment opportunities. However, despite the discussed differences, it seems that, in general, the disclosed uses of proceeds do not perfectly reveal the true motivations. To begin with, despite a few statistically significant differences, the overall distinction between the subsamples is relatively small. In addition, firms issuing seasoned equity disclose several uses of proceeds and most often, the uses include both refinancing debt and investing activities.

7.1.5 Summary of findings on determinants of issuance decision

The most important finding of this section is that both misvaluation and investment opportunities matter in terms of issuance decisions. Considering the likelihood of equity issuance, univariate analyses and logistic regressions show that firm-specific error and long-term value-to-book are positively related to the probability of seasoned equity offering. Generally, the findings are strongly significant. Findings on the size of equity issue, on the other hand, suggest that investment opportunities are an important determinant of issue size, whereas the effect of misvaluation on issue size remains questionable. Specifically, traditional OLS regression exhibits significantly positive coefficients for both firm-specific error and long-term value-to-book. However, after controlling for the well-known endogeneity problem, the relation between firm-specific error and issue size becomes considerably weaker. Thus, as the issue size is perhaps one of the most important considerations in the issuance process, the role of market timing as a stand-

alone explanation of financing decisions is debatable. Nonetheless, the findings on issue size do not question the importance of market timing as complementary model.

Finally, consistent with other findings, the results of uses of proceeds prove the significance of investment opportunities as a motivation for equity issue. Issuers with high long-term value-to-book exhibit a substantial growth in investing activities after the offering. On the other hand, long-term debt reductions and liquidity improvements seem to be important uses of proceeds for high firm-specific error issuers. Moreover, the examination of pre-issue characteristics of issuing firms indicates that market valuation is a strong motivation at least among highly levered and illiquid firms. The analysis of stated uses of proceeds provides strong support for the implications based on accounting variable experiments. Despite imperfections related to the public disclosure, the main points are clearly visible. In addition, the positive relation between long-term value-to-book and investment activities, as well as between firm-specific error and non-investment related uses of proceeds, confirms the validity of decomposed market-to-book. As a conclusion, Table 15 summarizes the findings and relates them to the hypotheses.

Table 15: Summary of findings on determinants of issuance decision

	Expected relation		Empirical evidence	
	Hypothesis	Formulation of hypothesis	Summary of key findings	Reject H_0?
Likelihood of seasoned equity offering	*H1a.*	Likelihood of seasoned equity offerings increases with overvaluation.	**Strong support.** Firms with high firm-specific error are more likely to make seasoned equity offerings.	**Yes**
	H1b.	Likelihood of seasoned equity offerings increases with favorable investment opportunities.	**Strong support.** Firms with high long-term value to-book are more likely to make seasoned equity offerings.	**Yes**
Size of equity issue	*H2a.*	Size of seasoned equity offerings increases with overvaluation.	**Moderate support.** OLS regression exhibits strong significance but more sophisticated models display weak significance, and even inconsistent signs.	**Partly yes**
	H2b.	Size of seasoned equity offerings increases with investment opportunities.	**Strong support.** The relation between long-term value-to-book and issue size is positive and strongly significant in all specifications.	**Yes**
Usage of proceeds	*H3a.*	The fraction of the proceeds from equity offerings spent on non-investment related purposes increases with overvaluation.	**Strong support.** Firm-specific error affects positively the post-issue long-term debt reductions and changes in liquid assets.	**Yes**
	H3b.	The fraction of the proceeds from equity offerings spent on investing activities increases with investment opportunities.	**Strong support.** Long-term value-to-book affects positively the post-issue CAPEX and R&D, as well as the changes in inventory and total assets.	**Yes**

7.2 Determinants of abnormal returns

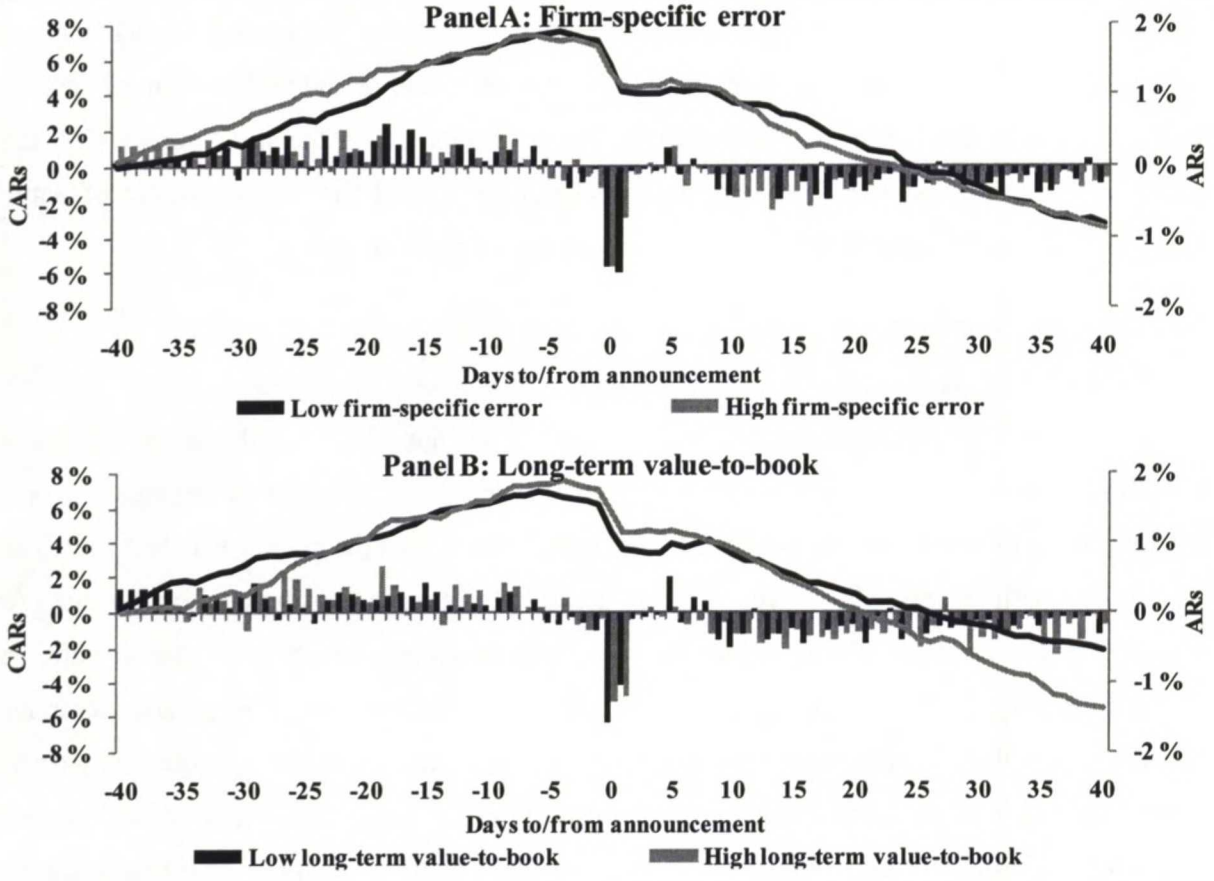
Negative price reaction to the announcement of seasoned equity offering and poor post-issue stock return performance are the most important cornerstones of the recent theoretical development in the area of issuance decisions. Generally, these well-known phenomena are regarded as the key evidence in favor of the explanations based on market timing and real investments. Thus, in order to test the predictions of market timing and real investment theories to the core, both short-term and long-term abnormal returns are on the front burner. The first section concentrates on the short-term abnormal returns around the announcement of equity offering, whereas the latter focuses on long-term post-issue performance.

7.2.1 Announcement effect

I begin the investigation of the shareholder wealth effect around the announcement of seasoned equity offering with univariate analysis. Panels A and B in Figure VIII plot the abnormal returns, as well as cumulative abnormal returns, by subsamples created on the basis of firm-specific error and long-term value-to-book, respectively. The overall return patterns in both Panels A and B are well in line with the prior literature. First, we are able to observe that the abnormal returns for issuers begin accumulating well before the issue announcement, which is consistent with, for example, findings of Eckbo and Masulis (1992), Bayless and Chaplinsky (1996), and Heron and Lie (2004). On the announcement date, equity issuers experience significantly negative abnormal returns. Similar returns are observed for the following day, as well. Thus, the overall stock price reaction to the announcement within my sample corresponds duly to the prior empirical literature. Finally, firms issuing seasoned equity seem to experience a distinct post-announcement drift, which is also reported in most of the prior studies. All in all, the significant price reaction to seasoned equity offerings leaves little doubt that these corporate events typically convey new information to the market. What is more difficult to determine, of course, is the precise content of the new information that the market is reacting to: how do misvaluation and investment opportunities affect the announcement effect?

Figure VIII: Abnormal returns around announcement of seasoned equity offering

The figure presents the average daily abnormal returns (ARs) and cumulative abnormal returns (CARs) for firms issuing seasoned equity from 40 days before through 40 days after the initial announcement. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The abnormal returns are calculated based on the market model parameters estimated days of -300 to -41 using S&P 500 as the market proxy. Cumulative abnormal returns and daily abnormal returns are illustrated by lines and columns, respectively. Panel A presents the abnormal returns for subsamples formed on median firm-specific error. Panel B presents the abnormal returns for subsamples formed on median long-term value-to-book. Subsample breakpoints are formed using the sample of seasoned equity offerings.



What comes to the subsamples formed on firm-specific error, the return patterns of the two groups seem very similar. The price run-up pattern of high firm-specific error issuers begins slightly earlier but, on the other hand, the cumulative abnormal returns of both groups coincide approximately 15 days before the announcement. Looking at the window [0 , 1], it seems that low firm-specific error issuers experience a greater negative market reaction relative to the group of high firm-specific error. After the announcement, the abnormal returns of both groups are somewhat identical.

Panel B in Figure VIII, on the other hand, considers the effect of long-term value-to-book on the abnormal returns around the announcement. Again, the overall return patterns of both groups are

surprisingly similar. In case of low long-term value-to-book issuers, the positive abnormal returns begin to cumulate earlier than with the other group. However, considering the whole pre-announcement period, [-40 , -1], firms with high long-term value-to-book slightly outperform low long-term value-to-book firms. On the other hand, the abnormal returns around the announcement seem identical. Perhaps the most significant difference between the groups formed on long-term value-to-book is the post-issue abnormal return pattern. High long-term value-to-book issuers seem to experience markedly greater negative abnormal returns.

To study the significance of the differences in cumulative abnormal returns between subsamples observed in Figure VIII, I tabulate the cumulative abnormal returns for different event windows and employ traditional test statistics. Table 16 presents the results. All in all, it seems that the effects of firm-specific error and long-term value-to-book on the short-term abnormal returns around the announcement are fragile. There are only two statistically significant differences. Firstly, equity issuers with low firm-specific error underperform the high firm-specific error issuers for the event window of [0 , 1]. However, it is impossible to judge the exact effect of firm-specific error on the market reaction based solely on this finding. As we are able to see, four other event windows employed fail to show any statistical significance. Moreover, the signs of differences are ambiguous. Secondly, consistent with the interpretation based on the return pattern of Panel B in Figure VIII, the post-announcement trend in abnormal returns is negatively related to long-term value-to-book.

Table 16: Cumulative abnormal returns around announcement of seasoned equity offering

The table reports the average cumulative abnormal returns for subsamples formed on median firm-specific error and long-term value-to-book for several event windows. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. Pre-announcement period, announcement period, and post-announcement period are presented separately. The cumulative abnormal returns for each event window are calculated based on the market model parameters estimated days of -300 to -41 using S&P 500 as the market proxy. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *t* statistics for the test that means are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	Firm-specific error				**Long-term value-to-book**			
	Low	High	Difference	*t*	Low	High	Difference	*t*
Pre-announcement period								
[-40 , -1]	7.01 %	6.62 %	-0.40 %	0.21	6.14 %	6.99 %	0.85 %	0.44
Announcement period								
Announcement date	-1.45 %	-1.41 %	0.04 %	0.16	-1.58 %	-1.31 %	0.27 %	0.97
[0 , 1]	-2.95 %	-2.11 %	0.84 %**	2.28	-2.57 %	-2.55 %	0.03 %	0.07
[2 , 2]	-3.28 %	-2.63 %	0.65 %	1.25	-3.09 %	-2.90 %	0.18 %	0.34
[-20 , 20]	-2.31 %	-4.20 %	-1.89 %	1.21	-2.97 %	-3.96 %	-0.99 %	0.61
[-40 , 40]	-3.34 %	-3.50 %	-0.16 %	0.07	-2.32 %	-5.56 %	-3.23 %	1.31
Post-announcement period								
[1 , 40]	-8.71 %	-8.32 %	0.39 %	0.28	-6.81 %	-10.58 %	-3.78 %***	2.60

In summary, it seems that misvaluation and investment opportunities do not correlate significantly with the returns around the issue announcement. This might, of course, be attributable to the failure of univariate analysis to control adequately for other significant factors. On the other hand, it is also possible that the findings actually reflect the reality. The degree of misvaluation and investment opportunities could be irrelevant in terms of investor decision making around the issue announcement. Or perhaps investors are simply unable to perceive the degree of misvaluation and investment prospects reliably in the short run.

Following the prior literature, I continue the investigation of cumulative abnormal returns in a multivariate setting where numerous firm characteristics are applied to OLS model. Naturally, misvaluation and investment opportunities proxied by firm-specific error and long-term value-to-book, respectively, are the variables of interest. The regression specification is based on the previous empirical studies. Table 17 reports the results for seven multivariate regressions where the dependent variables are cumulative abnormal returns for several event windows.

Table 17: OLS regression: Determinants of abnormal announcement returns

The table reports the regression coefficients and corresponding test statistics for the sample of seasoned equity offerings. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. Pre-announcement period, announcement period, and post-announcement period are presented separately. The dependent variables are the cumulative abnormal returns for the following event windows: [-40 , -1], announcement date, [0 , 1], [2 , 2], [-20 , 20], [-40 , 40], and [1 , 40]. Firm-specific error and long-term value-to-book are highlighted with grey color. Market-to-book is simply the ratio of stock price to the book value per share. Relative issue size is defined as the ratio of newly issued primary shares to total number of shares outstanding. Return on assets (ROA) is calculated by dividing the net income by total assets. Relative cash balance is the ratio of cash and cash equivalents to industry-specific median cash and cash equivalents where cash and cash equivalents are scaled by total assets. Deviation from target leverage is calculated by dividing the actual book leverage by the target leverage estimated through industry-specific OLS model. Total discretionary accruals is difference between total accruals and non-discretionary accruals which are estimated through two-step OLS procedure. Assets is the natural logarithm of the total assets. Analyst coverage refers to the maximum number of analysts that make annual earnings forecasts in any month over one-year period before the issue. Dividends is the ratio of total cash dividends to total assets. Proportion of secondary shares is the ratio of newly issued secondary shares to total number of shares issued. Prestigious underwriter is a dummy variable that equals one if the lead underwriter is regarded as prestigious according to the contemporaneous Carter-Manaster underwriter reputation ranking. Test statistics reported in parentheses below the regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

	Dependent variable: Cumulative abnormal returns for various event windows						
	Pre-announcement	**Announcement**					**Post-announc**
Independent variables	I: [-40 , -1]	II: Announcement	III: [0 , 1]	IV: [2 , 2]	V: [-20 , 20]	VI: [-40 , 40]	VII: [1 , 40]
Firm-specific error	-0.02 (-0.70)	-0.00 (-0.21)	0.01* (1.87)	0.01 (0.88)	0.00 (0.01)	-0.00 (-0.12)	0.02 (0.88)
Long-term value-to-book	0.01 (0.38)	-0.00 (-0.32)	0.00 (0.31)	0.00 (0.17)	0.00 (0.00)	0.03 (0.69)	0.02 (0.78)
Market-to-book	-0.01 (-0.53)	-0.00 (-0.12)	-0.00 (-0.32)	-0.00 (-0.08)	-0.01 (-0.60)	-0.03 (-1.40)	-0.00 (-0.82)
Relative issue size	-0.03 (-0.66)	-0.01** (-2.25)	-0.01 (-1.22)	-0.02** (-2.51)	-0.02* (-1.94)	0.06 (1.21)	0.00 (0.13)
Return on assets	0.00 (0.21)	0.01 (0.45)	-0.01 (-0.70)	-0.02 (-0.96)	-0.25*** (-4.14)	-0.32*** (-3.53)	-0.07 (-1.30)
Relative cash balance	-0.02 (-0.82)	-0.00 (-0.33)	-0.01 (-1.39)	-0.01 (-1.43)	-0.06** (-2.52)	-0.04 (-0.98)	-0.00 (-0.20)
Deviation from target leverage	-0.00 (-0.48)	0.00 (0.44)	0.00 (1.00)	0.00 (0.43)	-0.00 (-0.87)	-0.01 (-0.81)	-0.00 (-1.43)
Total discretionary accruals	0.01 (0.10)	-0.01 (-1.07)	-0.01 (-0.83)	-0.03 (-1.18)	0.01 (0.09)	0.05 (0.46)	0.04 (0.78)
Assets	-0.02 (-0.99)	0.00 (0.38)	0.00 (0.09)	0.01** (1.98)	0.01 (1.02)	0.01 (0.40)	0.02* (1.93)
Analyst coverage	0.01 (0.41)	0.00 (0.70)	0.00 (0.27)	0.01 (0.98)	-0.00 (-0.10)	0.02 (0.49)	0.00 (0.23)
Dividends	0.01 (0.37)	0.00 (0.46)	-0.00 (-0.36)	-0.00 (-0.09)	-0.02 (-0.78)	0.02 (0.60)	0.01 (0.59)
Proportion of secondary shares	0.03 (1.11)	-0.00 (-1.07)	-0.00 (-1.13)	-0.00 (-0.76)	-0.01** (-2.06)	0.01 (0.43)	-0.01 (-1.26)
Prestigious underwriter	-0.04 (-1.50)	0.02 (1.10)	0.00 (0.13)	0.01 (1.13)	0.00 (0.27)	-0.09 (-1.58)	-0.01 (-0.16)
Constant term	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	661	661	661	661	654	654	654
p-value (F-test)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.07	0.06	0.07	0.07	0.05	0.05	0.06

Consistent with the implications based on the univariate analysis, it seems that the effects of firm-specific error and long-term value-to-book on the market reaction are very limited. Furthermore, the effects of these valuation measures on price run-up and post-announcement drift are also insignificant. The only statistically significant coefficient of firm-specific error is estimated for the event window [0 , 1]. Accordingly, misvaluation is positively related to the magnitude of the announcement effect, which is inconsistent with my hypothesis. However, the mixed estimates for other event windows restrict the ability to make reliable generalizations.

Following Barclay and Litzenberger (1988), Dierkens (1991), Pilotte (1992), and Denis (1994), I have included market-to-book as an explanatory variable in my regression specification. Consistent with their findings, the impact of market-to-book remains statistically insignificant for all event windows under review. According to Eckbo et al. (2007), the market reaction should be more negative the greater the issue size because the risk of misuse of proceeds, as well as adverse selection costs, increases with the issue size. Similar to Korajczyk et al. (1990), Masulis and Korwar (1996), and Bayless and Chaplinsky (1996), I find that larger offerings generate a greater price drop at the announcement. On the other hand, Jung et al. (2006), Barclay and Litzenberger (1988) and Mikkelson and Partch (1986) fail to find any statistically significant relation between issue size and market reaction.

Jensen (1986) argues that financial slack increases the management's discretion. As expected, return on assets and relative cash balance that proxy for financial slack are negatively associated with the price reaction. For certain event windows, the coefficients are statistically significant. On the other hand, another proxy of financial slack, deviation from target leverage, remains ambiguous and statistically insignificant for all event windows. In spirit of Teoh et al. (1998), I control for the accruals but fail to find any statistically significant results. According to D'Mello et al. (2003) and Eckbo et al. (2007), most theories of financing decisions predict that the ex ante uncertainty about issuers' future prospects should result in a greater price drop. Several studies have examined this using various proxies for uncertainty. Dierkens (1991), Krishnaswami and Subramaniam (1999), and D'Mello et al. (2003), for example, use stock return volatility and residual volatility[36] as a measure of uncertainty. Convincingly, all the papers document that the price drop is less severe in case of firms with smaller volatility. Similarly, Krishnaswami and

[36] Residual volatility is the standard deviation of the market-adjusted residual returns during a specified period before the announcement of equity issue. Usually, the measurement period is [-250,-1] or [-200,-1].

Subramaniam (1999), D'Mello and Ferris (2000), and D'Mello et al. (2003) show that the number of analysts following the company, firm size, and firm's life-cycle stage are positively related to the magnitude of announcement effect. Accordingly, I use firm size, analyst coverage, and dividend payout as measure of potential information asymmetry. For all event windows, only firm size is associated with statistical significance. Namely, total assets are significantly positively related to the magnitude of the post-announcement drift, just as expected. The proportion of secondary shares is negatively related to the market reaction. Therefore, as suggested by Mikkelson and Partch (1986), it seems that investors are concerned about managers' self-interested motives. Finally, it seems that the underwriter reputation[37] does not have a statistically significant impact on the market reaction.

According to Eckbo et al. (2007), the results based on OLS regressions with cumulative abnormal returns as dependent variables are dubious because of a low explanatory power. They note that the specifications reported in the literature are typically associated with R^2 of less than 10 %. My regressions do not make an exception. In addition, Eckbo et al. (1990) show that linear estimators are biased and inconsistent when the issuer self-selects the timing of the event. Unfortunately, the magnitude of the bias introduced by these statistical problems within my sample is largely unknown. Thus, one should be cautious in the interpretations based on the regression results reported in Table 17.

In summary, despite the potential statistical problems, OLS regressions support the argumentation based on the univariate statistics. It actually seems that the effects of misvaluation and investment opportunities on the market reaction to announcement of seasoned equity offering are weak. However, the analysis does not reveal whether the weak relation is caused by the fact that these characteristics are not regarded as material by investors, or simply by investors' inability to perceive these factors reliably. Investment theory suggests that future prospects and potential misvaluation are important considerations behind investors' decisions. As a result, the latter explanation seems more attractive. Certain findings provide support to this explanation, as well. Firstly, also other variables that are difficult to observe ex ante in case of individual issuers, such as deviation from target leverage and discretionary accruals, display statistically

[37] Underwriter reputation is measured by Carter-Manaster underwriter reputation rankings and the list of prestigious underwriters that is published annually as part of the ranking documentation. The list contains approximately 20 underwriters. Jay Ritter publishes the annual rankings at: http://bear.cba.ufl.edu/ritter/ipodata.htm

insignificant coefficients. Secondly, despite small differences in the disclosure behavior of equity issuers presented in Table 14, the overall public communication of issuing firms seems somewhat homogeneous. For example, the vast majority of equity issuers disclose several motives for the issuance decision. As a result, reliable conclusions about the motivations for the offering might be impossible to make at the time of announcement.

7.2.2 Long-term post-issue performance

In this section, I focus on long-term post-issue performance of firms issuing seasoned equity. According to the theory of market timing, the observed underperformance is caused by ex ante overvaluation. Specifically, the market is slow to recognize the initial overvaluation and the adjustment in valuation level is a gradual process. Real investment theory, on the other hand, regards ex ante real options on investment projects as the most important reason behind poor long-term stock returns among equity issuers. The decomposed market-to-book ratio provides me with a unique opportunity to discriminate between these two competing explanations. The prior literature uses two approaches to investigate the long-term abnormal returns, buy-and-hold and calendar-time abnormal returns. To improve the quality of analysis, I implement the both approaches. As a sharp contrast, Hertzel and Li (2007) employ only calendar-time abnormal returns as a measure of long-term performance.

I begin with buy-and-hold abnormal returns. The buy-and-hold experiment involves buying the issuing firm's stock in the month following the issue, and holding the stock for a period of three to five years or until delisting. Panels A and B in Figure IX present the five-year abnormal performance of equity issuers against S&P 500 and 5 x 5 size and market-to-book ratio matched portfolios, respectively.

Figure IX: Post-issue buy-and-hold abnormal returns

The figure presents the average equal-weighted cumulative buy-and-hold abnormal returns for firms issuing seasoned for the period of 60 months after the offering. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The average cumulative buy-and-hold abnormal returns are shown separately for subsamples formed on median firm-specific error and long-term value-to-book. Panel A presents the cumulative buy-and-hold abnormal returns that are calculated using S&P 500 index as benchmark portfolio. Panel B presents the cumulative buy-and-hold abnormal returns that are calculated using Fama-French 5 x5 size and market-to-book matched portfolios as benchmark portfolio. Subsample breakpoints are formed using the sample of seasoned equity offerings.

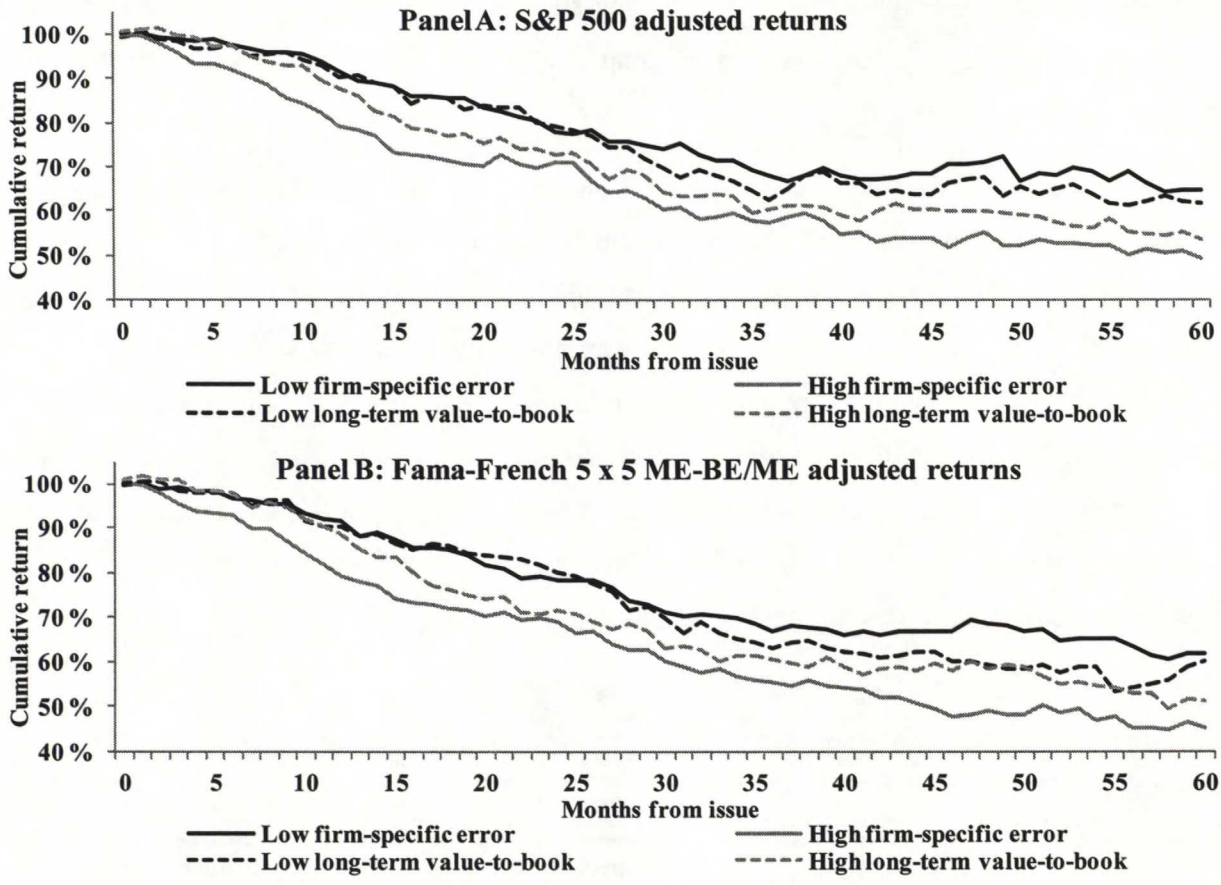


Figure IX highlights three interesting aspects regarding the long-term performance. Firstly, it seems that, on average, firms issuing seasoned equity experience significant underperformance during five-year period after the offering. Consistent with, for example, the findings of Loughran and Ritter (1995), Brav et al. (2000), and Eckbo et al. (2000), the underperformance is remarkably strong. The annual abnormal returns seem to vary consistently between -10 % and -15 %, which is comparable to several empirical papers employing buy-and-hold returns. Secondly, firms associated with high ex ante firm-specific error seem to underperform low firm-specific error issuers significantly. The difference between these subsamples remains robust regardless of the performance benchmark. Thus, the observed pattern provides preliminary evidence consistent with the market timing hypothesis, that is, underperformance increases with

ex ante overvaluation. Thirdly, the post-issue performance of low and high long-term value-to-book issuers seems roughly similar. Or to be more precise, it actually seems that high long-term value-to-book issuers experience somewhat more negative long-term abnormal returns but the difference is negligible. Nonetheless, the finding suggests that ex ante investment opportunities might affect the issuer performance in the long run as predicted by real investment theory by Carlson et al. (2006).

Table 18 describes the buy-and-hold returns similar to Figure IX but introduces statistical significance. The results are notably unambiguous. For both periods and performance benchmarks, the difference between high and low firm-specific error issuers is statistically significant. Thus, issuing firms with greater mispricing earn lower post-issue returns. However, the difference in abnormal performance between high and low long-term value-to-book issuers is insignificant for all specifications. In summary, considering the univariate analysis as a whole, the results are more consistent with the market timing explanations for post-issue underperformance, and do not unambiguously support real investment explanations that link post-issue performance with investment activities.

Table 18: Post-issue buy-and-hold abnormal returns

The table reports the average annual equal-weighted cumulative buy-and-hold abnormal returns for subsamples formed on median firm-specific error and long-term value-to-book for three- and five-year post-issue period. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The table shows the cumulative buy-and-hold abnormal returns that are calculated using both S&P 500 index and Fama-French 5 x5 size and market-to-book matched portfolios as benchmark portfolio. Subsample breakpoints are formed using the sample of seasoned equity offerings. The table reports the *t* statistics for the test that means are similar for the both subsamples. Test statistics reported next to differences are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	Firm-specific error				Long-term value-to-book			
	Low	High	Difference	*t*	Low	High	Difference	*t*
Three-year period								
S&P 500	-12.1 %	-16.8 %	-4.7 %**	-2.16	-14.4 %	-15.4 %	-1.0 %	-0.13
5 x 5 ME-BE/ME based portfolio returns	-12.4 %	-17.9 %	-5.5 %**	-2.39	-14.2 %	-15.4 %	-1.2 %	-0.77
Five-year period								
S&P 500	-8.3 %	-13.3 %	-4.9 %**	-2.28	-9.2 %	-11.8 %	-2.6 %	-0.65
5 x 5 ME-BE/ME based portfolio returns	-9.2 %	-14.6 %	-5.4 %**	-2.30	-9.7 %	-12.5 %	-2.9 %	-1.29

To control for other possible factors affecting the long-term performance, I estimate several OLS models with buy-and-hold abnormal return as dependent variables. The model specifications resemble significantly the regression equations employed with short-term abnormal returns in Table 19. The aforementioned control variables used are directly applicable to the model of long-

term abnormal performance, as well. In addition, I introduce three new control variables to the OLS equation. Eckbo et al. (2000) suggest that the post-issue underperformance is, at least partly, attributable to decreasing leverage and increasing stock liquidity. As a result, long-term debt reductions and changes in share turnover are added. Moreover, based on the concept of pseudo market timing by Schultz (2003), I include three-year stock price run-up among control variables. Table 19 reports the results based on multivariate OLS analysis.

Table 19: OLS regression: Determinants of buy-and-hold abnormal returns

The table reports the regression coefficients and corresponding test statistics for the sample of seasoned equity offerings. Data is collected from Thomson Financial SDC Platinum, Thomson Financial Worldscope, and Institutional Broker Estimate System (I/B/E/S) databases, and the period under review is from 1982 to 2006. The dependent variables are the equal-weighted buy-and-hold abnormal returns for the three- and five-year post-issue period that are calculated using S&P 500 index or Fama-French 5 x5 size and market-to-book matched portfolios as benchmark portfolio. Firm-specific error and long-term value-to-book are highlighted with grey color. Market-to-book is simply the ratio of stock price to the book value per share. Relative issue size is defined as the ratio of newly issued primary shares to total number of shares outstanding. Return on assets (ROA) is calculated by dividing the net income by total assets. Relative cash balance is the ratio of cash and cash equivalents to industry-specific median cash and cash equivalents where cash and cash equivalents are scaled by total assets. Deviation from target leverage is calculated by dividing the actual book leverage by the target leverage estimated through industry-specific OLS model. Total discretionary accruals is difference between total accruals and non-discretionary accruals which are estimated through two-step OLS procedure. Assets is the natural logarithm of the total assets. Analyst coverage refers to the maximum number of analysts that make annual earnings forecasts in any month over one-year period before the issue. Dividends is the ratio of total cash dividends to total assets. Proportion of secondary shares is the ratio of newly issued secondary shares to total number of shares issued. Prestigious underwriter is a dummy variable that equals one if the lead underwriter is regarded as prestigious according to the contemporaneous Carter-Manaster underwriter reputation ranking. Stock price run-up is the change in stock price during the previous three year. Long-term debt reduction refers to the net repayments of long-term debt during the period under review. Change in share turnover is the ratio of share turnover at the end of the corresponding post-issue period to share turnover for the year preceding the seasoned equity offering. Share turnover, in turn, denotes to the ratio of annual trading volume to total number of shares outstanding. Test statistics reported in parentheses below the regression coefficients are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

	Dependent variable: Buy-and-hold abnormal returns			
	Three-year period		**Five-year period**	
Independent variables	I: S&P 500	II: 5 x 5 ME-BE/ME	III: S&P 500	IV: 5 x 5 ME-BE/ME
Firm-specific error	-0.03	-0.07 *	-0.06	-0.07
	(-0.47)	(-1.70)	(-1.19)	(-1.23)
Long-term value-to-book	0.18 *	0.24 **	0.21 *	0.33 **
	(1.76)	(2.01)	(1.70)	(2.23)
Market-to-book	-0.07 **	-0.03	-0.03	-0.02
	(-2.24)	(-1.01)	(-1.19)	(-0.71)
Relative issue size	-0.11	-0.04	-0.15	-0.06
	(-1.53)	(-0.56)	(-1.04)	(-0.51)
Return on assets	-0.33	-0.71	0.26	-0.04
	(-0.52)	(-0.84)	(0.60)	(-0.07)
Relative cash balance	-0.02	-0.07	-0.10	-0.23
	(-0.10)	(-0.26)	(-0.55)	(-0.86)
Deviation from target leverage	-0.01	-0.02	-0.01	-0.02
	(-0.66)	(-0.95)	(-0.32)	(-0.97)
Total discretionary accruals	-0.28	-0.06	-0.03	-0.19
	(-1.49)	(-0.55)	(-0.19)	(-1.47)
Assets	-0.00 *	-0.00	-0.02	-0.00
	(-1.96)	(-1.32)	(-0.98)	(-0.64)
Analyst coverage	0.03	0.03	0.03	0.03
	(1.30)	(1.58)	(1.28)	(1.63)
Dividends	-0.08	-0.06	-0.12	-0.13
	(-0.84)	(-0.73)	(-0.90)	(-1.29)
Proportion of secondary shares	-0.01	-0.01	0.05	0.07
	(-0.17)	(-0.09)	(0.39)	(0.58)
Prestigious underwriter	-0.06	-0.14 *	-0.05	-0.05
	(-1.08)	(-1.75)	(-0.67)	(-1.03)
Stock price run-up	-0.04	-0.09	-0.36	-0.42
	(-0.30)	(-0.69)	(-1.54)	(-1.56)
Long-term debt reduction	0.24 ***	0.20 **	0.10	0.17
	(2.71)	(2.45)	(0.79)	(1.25)
Change in share turnover	0.00	0.00	0.00	0.00
	(1.09)	(1.40)	(1.05)	(1.34)
Constant term	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Number of observations	844	825	844	798
p-value (F-test)	0.00	0.00	0.00	0.00
R^2	0.08	0.08	0.08	0.11

As we are able to observe, firm-specific error is negatively related to the post-issue abnormal stock returns across all specifications presented in Table 19. However, the relation is statistically significant only for three-year period employing 5 x 5 size and market-to-book ratio matched portfolios as benchmark. Thus, the impact of misvaluation on the long-term post-issue performance seems somewhat weak in a multivariate setting. Coefficients related to long-term value-to-book are of great interest. In contrast to implications of univariate analysis, ex ante investment opportunities seem to be positively related to the long-term performance. Furthermore, the relation is statistically significant across all specifications. Obviously, this is inconsistent with the predictions of the real investment theory. Of control variables, traditional market-to-book ratio and firm size are negatively related to post-issue stock returns with some coefficients being statistically significantly different from zero. The negative coefficients associated with firm size are a surprise. For example, Eckbo et al. (2007) note that the literature is relatively unanimous that the negative abnormal post-issue performance is mostly driven by small and rapidly growing firms. On the other hand, the coefficients of firm size are all close to zero and mostly statistically insignificant. Interestingly, long-term debt reductions and changes in share turnover are associated with positive coefficients, which is in sharp contrast to arguments of Eckbo et al. (2000). Moreover, some of the coefficients related to long-term debt reductions are statistically significant. Perhaps this is a consequence of the well-known empirical phenomenon that the most successful companies thrive with little debt. In other words, the success might be reflected in both the favorable post-issue returns and accelerating long-term debt reductions, which, in turn, results in a positive relation between the variables in question, as observed in Table 19. To conclude, it seems that neither falling leverage nor improving liquidity explain the poor long-term performance.

In summary, buy-and-hold abnormal returns suggest that, on average, issuers perform poorly in the long run regardless of ex ante characteristics. It also seems that the observed underperformance of equity issuers is, at least to some degree, caused by ex ante overvaluation of issuing firms. This is in line with the market timing hypothesis. On the other hand, my findings do not generally support the real investment explanations of underperformance. However, the results are plagued by statistical shortcomings. Firstly, the R^2 measures of around 10 % associated with the models in Table 19 complicate the trustworthy reasoning. Secondly, and perhaps more seriously, the measurement of long-term abnormal performance is especially

treacherous as pointed out by Fama (1998) and Eckbo et al. (2000). They suggest that empirically observed underperformance might stem from model misspecification. Particularly, the authors emphasize the risk of incorrectly rejecting the null hypothesis of no abnormal performance through buy-and-hold experiments. Thus, in order to make further generalizations and decide about the hypotheses solidly, it is absolutely necessary to continue the analysis with calendar-time approach.

In addition to buy-and-hold returns, calendar-time approach is a prime method to measure long-term performance in the financial literature. Interestingly, Hertzel and Li (2007) employ calendar-time abnormal returns to investigate the long-term performance of seasoned equity issuers. They form quartiles on firm-specific error, total error, and long-term value-to-book and employ Fama-French (1993) three-factor model and Carhart (1997) four-factor model to measure the abnormal performance for the period of three years. I intend to follow in the footsteps of Hertzel and Li (2007) with certain exceptions. Firstly, in compliance with the preceding analysis, I concentrate only on firm-specific error and long-term value-to-book. Moreover, in addition to the three-year period, I also report results for a post-issue period of five years employing both equal-weighted and value-weighted calendar-time portfolios. Secondly, I expect the results to be somewhat different from Hertzel and Li (2007) because of differences in samples and decomposition procedures. The most important difference from the procedure of Hertzel and Li (2007) is the more rigorous industry classification used in this thesis. Nonetheless, despite the discussed differences, my results based on calendar-time approach provide an interesting point of comparison for the findings of Hertzel and Li (2007).

Table 20 presents the post-issue abnormal stock price performance for quartiles classified by firm-specific error and long-term value-to-book using both Fama-French three-factor model and Carhart four-factor model. For ease of exposition, Table 20 reports the t statistic only for the intercept, that is, Jensen's α. In general, the other estimated coefficients are strongly statistically significant.

Table 20: Calendar-time portfolio abnormal returns

The table reports the calendar time factor regression coefficients for quartiles formed on firm-specific error and long-term value-to-book. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, as well as Kenneth French's web-based data library. The period under review is from 1982 to 2006. The portfolios consist of firms that issue equity in the prior three or five years and belong to each firm-specific error and long-term value-to-book quartile. Quartile breakpoints are formed using all observations, that is, both issuer and control samples, such that different quartiles have different number of issuing firms. In general, quartile 1 has least number of issuers and quartile 4 has most issuers. The table reports the regression results for both Fama-French three-factor model and Carhart four-factor model. The performance of equal-weighted portfolios is observed separately from the performance of value-weighted portfolios. The dependent variables are the excess returns of the quartile portfolios over one-month T-bill rate. Independent variables are directly based on the factor pricing models. R_m is the return on value-weighted market portfolio, whereas R_f is the risk-free rate. *SMB* is the difference between the returns on small and large firms, *HML* is the difference between the returns on low and high market-to-book firms, and *UMD* is the difference between the returns on high and low one-year momentum firms. Test statistics reported in parentheses next to intercept estimates are based on heteroskedastic-consistent robust standard errors. For each variable of interest, ***, **, and * indicate that the coefficient is significantly different from zero at the 1 %, 5 %, and 10 % levels, respectively.

		Fama-French three-factor model						Carhart four-factor model						
		Intercept	*t*	$R_m - R_f$	SMB	HML	R^2	Intercept	*t*	$R_m - R_f$	SMB	HML	UMD	R^2
Three-year period														
Equal-weighted portfolios	**Firm-specific error**													
	Low	-0.26 %	(-1.64)	1.17	0.67	-0.03	*0.84*	-0.10 %	(-0.64)	1.14	0.69	-0.06	-0.18	*0.85*
	Quartile 2	-0.20 %	(-1.17)	1.12	0.65	0.09	*0.79*	-0.10 %	(-0.60)	1.10	0.66	0.07	-0.11	*0.80*
	Quartile 3	-0.35 %*	(-1.73)	1.25	0.59	0.05	*0.77*	-0.19 %	(-0.93)	1.22	0.61	0.02	-0.18	*0.78*
	High	-0.54 %	(-1.59)	1.17	0.75	-0.25	*0.68*	-0.39 %	(-1.13)	1.14	0.77	-0.28	-0.17	*0.69*
	Long-term value-to-book													
	Low	-0.20 %	(-1.62)	1.29	0.61	0.47	*0.65*	-0.14 %	(-0.98)	1.26	0.63	0.44	-0.18	*0.66*
	Quartile 2	-0.33 %**	(-1.97)	1.16	0.59	0.13	*0.81*	-0.15 %	(-0.92)	1.13	0.61	0.09	-0.20	*0.82*
	Quartile 3	-0.19 %	(-1.12)	1.23	0.68	-0.25	*0.85*	0.02 %	(0.11)	1.19	0.71	-0.29	-0.23	*0.87*
	High	-0.02 %	(-0.20)	1.10	0.68	-0.58	*0.75*	0.04 %	(0.15)	1.08	0.69	-0.59	-0.10	*0.75*
Value-weighted portfolios	**Firm-specific error**													
	Low	-0.33 %	(-1.63)	1.17	0.44	0.04	*0.73*	-0.29 %	(-1.37)	1.16	0.44	0.03	-0.05	*0.73*
	Quartile 2	-0.15 %	(-0.70)	1.13	0.21	-0.08	*0.68*	-0.29 %	(-1.32)	1.16	0.19	-0.05	0.15	*0.69*
	Quartile 3	-0.08 %	(-0.40)	1.06	0.08	-0.21	*0.68*	-0.04 %	(-0.17)	1.05	0.09	-0.22	-0.05	*0.68*
	High	-1.02 %***	(-2.72)	1.12	0.48	-0.42	*0.63*	-1.05 %***	(-2.75)	1.13	0.48	-0.41	0.04	*0.63*
	Long-term value-to-book													
	Low	-0.37 %	(-1.40)	1.16	0.17	0.34	*0.54*	-0.31 %	(-1.15)	1.15	0.18	0.33	-0.07	*0.54*
	Quartile 2	-0.38 %*	(-1.92)	1.18	0.24	-0.03	*0.73*	-0.35 %*	(-1.74)	1.17	0.24	-0.03	-0.03	*0.73*
	Quartile 3	0.11 %	(1.06)	1.15	0.30	-0.42	*0.79*	0.05 %	(0.74)	1.14	0.31	-0.44	-0.07	*0.79*
	High	0.09 %	(0.63)	0.94	0.37	-0.62	*0.66*	0.12 %	(1.28)	0.98	0.34	-0.58	0.22	*0.67*
Five-year period														
Equal-weighted portfolios	**Firm-specific error**													
	Low	-0.22 %	(-1.60)	1.13	0.71	0.02	*0.87*	-0.07 %	(-0.52)	1.10	0.73	-0.01	-0.17	*0.89*
	Quartile 2	-0.16 %	(-1.06)	1.08	0.62	0.12	*0.81*	-0.05 %	(-0.33)	1.06	0.64	0.10	-0.13	*0.82*
	Quartile 3	-0.41 %**	(-2.26)	1.21	0.59	0.12	*0.79*	-0.25 %	(-1.37)	1.18	0.61	0.09	-0.19	*0.80*
	High	-0.53 %	(-1.64)	1.14	0.73	-0.20	*0.68*	-0.39 %	(-1.17)	1.11	0.75	-0.23	-0.17	*0.69*
	Long-term value-to-book													
	Low	-0.58 %***	(-3.14)	1.22	0.59	0.44	*0.75*	-0.42 %**	(-2.30)	1.19	0.61	0.41	-0.18	*0.77*
	Quartile 2	-0.30 %**	(-1.98)	1.13	0.58	0.19	*0.82*	-0.13 %	(-0.89)	1.09	0.61	0.15	-0.19	*0.84*
	Quartile 3	-0.02 %	(-0.41)	1.18	0.68	-0.15	*0.86*	0.20 %	(1.67)	1.13	0.71	-0.19	-0.24	*0.89*
	High	-0.01 %	(-0.46)	1.10	0.68	-0.48	*0.78*	0.11 %	(1.39)	1.08	0.70	-0.50	-0.11	*0.78*
Value-weighted portfolios	**Firm-specific error**													
	Low	-0.50 %***	(-2.95)	1.14	0.48	0.05	*0.79*	-0.49 %***	(-2.85)	1.14	0.48	0.05	-0.01	*0.79*
	Quartile 2	-0.57 %***	(-3.10)	1.10	0.17	-0.02	*0.73*	-0.63 %***	(-3.36)	1.12	0.16	0.00	0.07	*0.73*
	Quartile 3	-0.45 %**	(-2.39)	1.07	0.06	-0.20	*0.73*	-0.44 %**	(-2.31)	1.07	0.06	-0.20	-0.01	*0.73*
	High	-0.63 %*	(-1.76)	1.05	0.43	-0.44	*0.67*	-0.63 %*	(-1.71)	1.05	0.43	-0.44	0.00	*0.68*
	Long-term value-to-book													
	Low	-0.91 %***	(-4.60)	1.11	0.15	0.37	*0.65*	-0.84 %***	(-4.21)	1.10	0.16	0.36	-0.07	*0.66*
	Quartile 2	-0.60 %***	(-3.16)	1.14	0.22	0.00	*0.73*	-0.54 %***	(-2.81)	1.13	0.23	-0.01	-0.06	*0.73*
	Quartile 3	-0.22 %*	(-1.79)	1.12	0.28	-0.40	*0.83*	-0.24 %**	(-2.66)	1.12	0.28	-0.40	-0.01	*0.83*
	High	-0.09 %	(-1.33)	0.96	0.33	-0.59	*0.66*	-0.17 %	(-1.56)	0.98	0.31	-0.56	0.16	*0.67*

Overall, Table 20 shows evidence of a negative relation between the pre-issue firm-specific error and post-issue abnormal performance, which is consistent with the findings based on buy-and-hold abnormal returns. Furthermore, the observed negative relation is in line with the results of Hertzel and Li (2007). Specifically, in case of three-year equal-weighted portfolios, I observe that as firm-specific error increases, portfolio abnormal returns decrease monotonically for both multi-factor regressions. For three-year value-weighted portfolios, the change in abnormal returns is not as distinct as for equal-weighted portfolios but the highest firm-specific error quartile seems to experience highly significantly negative stock market performance. What is more, there is also a dramatic difference between Fama-French returns to issuers in the highest versus lowest firm-specific error quartile: equity issuers in the lowest firm-specific error quartile have average abnormal return that are not significantly different from zero, -0.33 % per month, whereas issuing firms in the highest quartile have significantly negative average post-issue abnormal returns, -1.02 %. The difference between highest and lowest quartile in value-weighted three-year abnormal returns based on Carhart four-factor model is essentially identical. The return pattern is generally the same, though less pronounced for the five-year period. As a conclusion, the calendar-time portfolio abnormal returns support the market timing related explanations of stock price performance after seasoned equity offerings.

Considering the implications of the real investment theory, average abnormal returns for long-term value-to-book quartiles form a valid test environment. Interestingly, Table 20 does not present any evidence that issuing firms in the highest long-term value-to-book quartile have lower post-issue abnormal returns than firms in the lowest quartile. On the contrary, in most cases, the average post-issue return to firms in the highest long-term value-to-book quartile is higher than that of firms in the lowest quartile. Specially, the long-term abnormal performance based on three-year value-weighted portfolios and five-year equal-weighted portfolios contrasts sharply with the real investment based explanation of poor post-issue returns. In addition, except for five-year value-weighted returns, it seems that highest long-term value-to-book quartiles do not underperform at all. In fact, the abnormal returns are positive, though insignificantly different from zero, for these quartiles. Consistent with the results of Hertzel and Li (2007), my evidence does not support real investment explanations of post-issue performance put forward by Carlson et al. (2006). This is further backed up by the analysis of usage of proceeds showing that post-issue investments actually increase with pre-issue long-term value-to-book. Taken this together

with the observed positive relation between long-term value-to-book and post-issue abnormal stock price performance, I am able to argue reliably that firms investing the most after seasoned equity offerings perform better than other issuers.

In summary, the findings based on calendar-time approach indicate a negative relation between post-issue abnormal returns and pre-issue firm-specific error against the lack of negative relation between post-issue abnormal returns and pre-issue long-term value-to-book. Moreover, findings founded on buy-and-hold returns are essentially similar. Thus, consistent with the theory of market timing, my findings generally identify firm-level overvaluation as the most important factor contributing to low post-issue returns. In addition, the evidence suggests that the real investment based explanations of equity issuers' poor long-term performance can be reasonably rejected.

However, as pointed out by Hertzel and Li (2007), there are several caveats with respect to the rejection of the real investment based explanations. Firstly, based on the analysis of usage of proceeds, high long-term value-to-book issuers seem to invest aggressively in research and development after the offering. As a result, issuing firms might contemporaneously be adding real options instead of merely converting existing real options into less risky assets in place. Thus, investments in research and development might mitigate the cornerstone of the real investment theory, that is, the post-issue risk reduction. In other words, the firm risk does not decrease as new risky real options are constantly added. This may explain why I do not observe lower post-issue returns for high long-term value-to-book issuers. Secondly, according to Hertzel and Li (2007), other factors than firm-specific error and long-term value-to-book may also contribute to low post-issue returns. This is, in particular, suggested by the fact that the explanatory power of regression models with buy-and-hold abnormal returns as dependent variables is outstandingly poor. Hertzel and Li (2007) acknowledge also an additional complication. Namely, issuers in the lowest firm-specific error quartiles, which might be considered as undervalued, do not experience positive abnormal returns after the offering. Of course, this might simply be due to a selection bias in that managers are reluctant to issue undervalued equity under any circumstances. Finally, according to Eckbo et al. (2007), variables that are used to construct the calendar-time portfolios, that is, firm-specific error and long-term value-to-book in this study, could be correlated with risk factors that are not captured by Fama-

French or Carhart models. In that case, the findings based on calendar-time approach might be affected by model misspecification. For example, Fama (1998) argues that the risk of misspecification is substantial. Nonetheless, all in all, I believe that I have taken all the possible measures to mitigate the statistical problems. Specifically, the usage of various methods, performance benchmarks, and time periods improves the credibility of my findings. Still, the magnitude of possible bias in the long-term abnormal returns remains an open question.

7.2.3 Summary of findings on abnormal returns

Considering the announcement effect, I fail to find any statistically significant and meaningful relation of firm-specific error and long-term value-to-book to the magnitude of market reaction at the announcement of seasoned equity offering. However, consistent with the prior literature, I document a significant stock price drop around the announcement. Based on my findings, it seems that neither misvaluation nor investment opportunities are in the public gaze. Thus, the evidence on cumulative abnormal returns around the announcement is generally inconsistent with both market timing and real investment explanations of issuance behavior. However, I cannot rule out the relevance of market timing or real investment theory based solely on this. Firstly, it is possible that investors are not able to observe mispricing and investment opportunities perfectly in the short run. Secondly, the OLS regressions with cumulative abnormal returns as dependent variables are potentially plagued by serious statistical problems and as a result, the estimates might be biased.

Consistent with the theory of market timing, I find that long-term post-issue abnormal stock returns are more negative for firms that are more overvalued. Despite well-known statistical problems related to the measurement of long-term abnormal returns, the negative relation between firm-specific error and long-term abnormal stock price performance seems robust. Similar conclusion is reached through all the methods I use in this thesis, that is, univariate analysis of buy-and-hold returns, OLS regressions with buy-and-hold returns as dependent variables, and calendar-time portfolio approach employing various holding periods and performance benchmarks. On the other hand, I fail to find any negative relation between post-issue abnormal returns and investment opportunities measured by long-term value-to-book. In contrast, several model specifications indicate a positive relation between long-term value-to-book and long-term post-issue abnormal returns. This evidence, taken together with the finding

that issuer with greater long-term value-to-book tend to invest more subsequent to the offering, is not supportive of the real investment theory. Thus, the analysis of long-term abnormal returns provides distinct support to the market timing based explanations of low long-term post-issue returns. In conclusion, Table 21 reviews the hypotheses and most important empirical results.

Table 21: Summary of findings on determinants of abnormal returns

	Expected relation		Empirical evidence	
	Hypothesis	Formulation of hypothesis	Summary of key findings	Reject H_0?
Announcement effect	*H4a.*	Negative market reaction to the announcement of equity offerings increases with overvaluation.	**No support.** There seems to be no relation between firm-specific error and cumulative abnormal returns. Moreover, signs of the coefficients are mixed accross univariate tests and regressions.	**No**
	H4b.	Negative market reaction to the announcement of equity offerings increases with investment opportunities that are converted into less risky assets in place.	**No support.** There seems to be no relation between long-term value-to-book and cumulative abnormal returns. Moreover, signs of the coefficients are mixed accross univariate tests and regressions.	**No**
Long-term post-issue performance	*H5a.*	Post-issue underperformance increases with overvaluation.	**Strong support.** In general, buy-and-hold abnormal returns, as well as calendar-time portfolios, exhibit a significant negative relation between firm-specific error and post-issue abnormal returns.	**Yes**
	H5b.	Post-issue underperformance increases with investment opportunities that are converted into less risky assets in place.	**No support.** Univariate analysis of buy-and-hold abnormal returns shows a sign as expected. The relation is, however, insignificant. In contrast, findings based buy-and-hold abnormal return regressions and calendar-time portfolios exhibit contradicting evidence. In other words, long-term value-to-book seems to be positively related to the post-issue abnormal returns.	**No**

8 Conclusions

This thesis studies how misvaluation and investment opportunities affect the decision to issue seasoned equity and issuance related abnormal returns. The aim is to investigate the likelihood of seasoned equity offering, as well as the issue size and uses of proceeds, by means of a decomposition of market-to-book ratio. What comes to the abnormal returns, both short-term cumulative abnormal returns around the issuance announcement and long-term abnormal stock price performance are under review.

I combine several theoretical models in order to explain the issuance decision and corresponding abnormal returns. The main setting is largely built on the theory of market timing articulated by Baker and Wurgler (2002) and the real investment theory put forward by Zhang (2005) and

Carlson et al. (2006). I argue that market timing and real investment theories are, in fact, complementary to each other.

The data on security offerings is obtained from Thomson Financial SDC Platinum database and consists of seasoned equity offerings in the USA from 1982 to 2006. In addition, I employ a comprehensive set of supplementary databases, including Thomson Financial Datastream and Worldscope, as well as Institutional Broker Estimate System database (I/B/E/S). The extensive data environment enables the usage of several filters to improve the data quality and, in turn, the credibility of the results presented in this thesis. In the final sample, there are 2 193 firm-year observations associated with seasoned equity offering, and 85 753 firm-years acting as a control group.

A novel methodology developed by Rhodes-Kropf et al. (2005) lays the foundation for my thesis. The accounting based methodology allows for the decomposition of market-to-book ratio into misvaluation and investment opportunity components. Previous financial literature has documented that firms issuing seasoned equity are associated with higher than average market-to-book ratios, as well as other measures of relative valuation. High relative valuation can be viewed both as a sign of overvaluation, consistent with the theory of market timing, or as a sign of favorable investment opportunities, consistent with the real investment theory. For the first time, I am able to discriminate between the theories by decomposing traditional market-to-book ratios. Accordingly, this thesis provides rigorous tests between the competing predictions and evidence on the possibility that both explanations contribute to the observed phenomena of equity issuance.

The findings of this thesis clearly show that both misvaluation and investment opportunities matter. Firm-specific error and long-term value-to-book that proxy for misvaluation and investment opportunities, respectively, affect positively the decision to issue seasoned equity. This finding is consistent with both the market timing and real investment theory of financing decisions. Moreover, investment opportunities are positively related to the size of the offering, as well as to the post-issue capital expenditure and research and development. On the other hand, the relation of ex ante misvaluation to the issue size seems weak, but misvaluation is significantly positively related to the long-term debt reductions and changes in liquid assets. As a whole, the

analysis of the determinants of issuance decision bolsters my hypotheses that seasoned equity offerings are, in general, motivated by both misvaluation and investment opportunities.

Consistent with the theory of market timing, I find that long-term post-issue abnormal stock returns are more negative for issuers that are more overvalued. In contrast, it seems that the relation of investment opportunities to the post-issue abnormal performance is positive. This is not supportive of the predictions based on the real investment theory. Thus, it seems that firm-level misvaluation is the most important factor contributing to observed low post-issue returns. However, because of the well-known statistical problems related especially to the risk adjustments, I cannot rule out that other factors may be relevant, as well. What comes to the short-term cumulative abnormal returns, I fail to find any meaningful relations between the components of market-to-book ratio and the magnitude of the market reaction to issuance announcements.

Based on my findings, it seems that both the market timing and real investment theory have elements of truth that help explain some aspects of financing decisions. At the same time, it seems that both models have problems and, especially alone, are unable to explain all the observed phenomena. Thus, it is perhaps time to reject the empirical competitive position between these two theories as stand-alone stories of financing decisions. Maybe, it is best to regard them as complementary to each other.

There are still several interesting areas that could be researched further. Firstly, my results confirm that the decomposition of market-to-book ratio has explanatory power over mispricing and investment opportunities. As a result, it would be of great interest to apply the methodology to other areas of corporate finance, or even to the research on asset management. In addition, factors affecting the degree of misvaluation and investment opportunities form a potential area for further empirical examination. For example, it would be interesting to examine the how analyst coverage, earnings management or disclosure policy affect the misvaluation component. The second important area not examined in this thesis relates to the in-depth issuance process. For example, it would be of great interest to study how misvaluation and investment opportunities affect the flotation method, choice of underwriters, underwriter compensation, allocation of offering, lock-up arrangements, and pricing, as well as price support.

References

Akhigbe, A., Easterwood, J., Richardson-Pettit, R., 1997. Wealth effect of corporate debt issues: The impact of issuer motivations. *Financial Management 26*, 32-47.

Alti, A., Sulaeman, J., 2007. When do high stock returns trigger equity issues? Unpublished working paper, University of Texas at Austin.

Altinkilic, O., Hansen, R., 2003. Discounting and underpricing in seasoned equity offers. *Journal of Financial Economics 69*, 285-324.

Ang, A., Gu, L., Hochberg, Y., 2005. Is IPO underperformance a Peso problem? Unpublished working paper, Columbia University.

Ang J., Cheng Y., 2006. Direct evidence on the Market-Driven Acquisition Theory. *The Journal of Financial Research* 29, 199-216.

Asquith, P., Mullins, D., 1986. Equity issues and offering dilution. *Journal of Financial Economics 15*, 61-89.

Baker, M., Stein, J., Wurgler, J., 2003. When does the market matter? Stock prices and the investment of equity dependent firms. *Quarterly Journal of Economics 118*, 969-1006.

Baker, M., Wurgler, J., 2002. Market timing and capital structure. *The Journal of Finance 57*, 1-32.

Barber, B., Lyon, J., 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial economics 43*, 341-372.

Barclay, M., Litzenberger, R., 1988. Announcement effects of new equity issues and the use of intraday price data. *Journal of Financial Economics 21*, 71-99.

Barth, M., Beaver, W., Landsman, W., 2001. The relevance of the value-relevance literature for financial accounting standard setting: Another view. *Journal of Accounting and Economics 31*, 77-104.

Bayless, M., Chaplinsky, S., 1996. Is there a window of opportunity for seasoned equity issuance? *The Journal of Finance 55*, 2219-2257.

Bayless, M., Jay, N., 2003. Is the performance of firms following seasoned equity issues anomalous? *Journal of Banking and Finance 27*, 1273-1296.

Bernanke, B., 1983. The determinants of investment: Another look. *The American Economic Review 73*, 71-75.

Bethel, J., Krigman, L., 2004. Unallocated shelf registration: Why doesn't everybody use it? Equity issuance, managerial choice, and market reaction. Unpublished working paper, Babson College.

Brav, A., Geczy, C., Gompers, P., 2000. Is the abnormal return following equity issuances anomalous? *Journal of Financial Economics 56*, 209-249.

Brav, A., Gompers, P., 1997. Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies. *The Journal of Finance 52*, 1791-1821.

Brennan, M., Schwartz, E., 1978. Corporate income taxes, valuation, and the problem of optimal capital structure. *Journal of Business 51*, 103-114.

Brous, P., Datar, V., Kini, O., 2001. Is the market optimistic about the future earnings of seasoned equity offering firms? *The Journal of Financial and Quantitative Analysis 36*, 141-168.

Brown, S., Warner, J., 1980. Measuring security price performance. *Journal of Financial Economics 8*, 205-258.

Brown, S., Warner, J., 1985. Using daily stock returns: The case of event study. *Journal of Financial Economics 14*, 3-31.

Burch, T., Christie, W., Nanda, V., 2004. Do firms time equity offerings? Evidence from the 1930s and 1940s. *Financial Management 33*, 5-23.

Cai F., Ghosh A., 2004. Optimal capital structure vs. pecking order theory: A further test. *Journal of International Business and Economic Research 2*, 61-68.

Carhart, M., 1997. On persistence in mutual fund performance. *The Journal of Finance 52*, 57-82.

Carlson, M., Fisher, A., Giammarino, R., 2005. Corporate investment and asset price dynamics: Implications for the cross-section of returns. The Journal of Finance 59, 2577-2603.

Carlson, M., Fisher, A., Giammarino, R., 2006. Corporate investment and asset price dynamics: Implications for SEO event studies and long-run performance. The Journal of Finance 61, 1009-1034.

Carlson, M., Fisher, A., Giammarino, R., 2007. SEOs, real options and risk dynamics: Empirical evidence. Unpublished working paper, The University of British Columbia.

Chang, X., Dasgupta, S., Hilary, G., 2006. Analyst coverage and financing decisions. *The Journal of Finance 61*, 3009-3048.

Choe, H., Masulis, R., Nanda, V., 1993. Common stock offerings across the business cycle: Theory and evidence. *Journal of Empirical Finance 1*, 1-31.

Clark, P., 1979. Investment in the 1970s: Theory, performance, and prediction. *Brookings Papers 1:1979*, 73-113.

Clarke, J., Dunbar, C., Kahle, K., 2001. Long-run performance and insider trading in completed and cancelled seasoned equity offerings. *The Journal of Financial and Quantitative Analysis 36*, 415-430.

Collins, D., Maydew, E., Weiss, I., 1997. Changes in the value-relevance of earnings and book values over the past 40 years. *Journal of Accounting and Economics 24*, 39-67.

Cornett, M., Mehran, H., Tehranian, H., 1998. Are financial markets overly optimistic about the prospects of firms that issue equity? Evidence from the voluntary versus involuntary equity issuance by banks. *The Journal of Finance 53*, 2139-2159.

Dahlquist, M., de Jong, F., 2004. Pseudo market timing: Fact or fiction? Unpublished working paper, Swedish Institute for Financial Research.

DeAngelo, H., DeAngelo, L., Skinner, D., 2004. Are dividends disappearing? Dividend concentration and the consolidation of earnings. *Journal of Financial Economics 72*, 425-456.

DeAngelo, H., DeAngelo, L., Stulz, R., 2007. Fundamentals, market timing, and seasoned equity offerings. Unpublished working paper, The University of Southern California.

DeAngelo, H., Masulis, R., 1980. Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics 8*, 3-29.

Denis, D., 1991. Shelf registration and the market for seasoned equity offerings. *Journal of Business 64*, 189-212.

Denis, D., 1994. Investment opportunities and the market reaction to equity offerings. *The Journal of Financial and Quantitative Analysis 29*, 159-177.

Denis, D., Sarin, A., 2001. Is the market surprised by poor earnings realizations following seasoned equity offerings? *The Journal of Financial and Quantitative Analysis 36*, 169-193.

Dierkens, N., 1991. Information asymmetry and equity issues. *The Journal of Financial and Quantitative Analysis 26*, 181-198.

Dittmar, A., Thakor, A., 2007. Why do firms issue equity? *The Journal of Finance 62*, 1-54.

D'Mello, P., Ferris, S., 2000. The information effect of analyst activity at the announcement of new equity issues. *Financial Management 29*, 78-95.

D'Mello, R., Schlingemann, F., Subramaniam, V., 2005. Are there monitoring benefits to institutional ownership? Evidence from seasoned equity offerings. Unpublished working paper, Wayne State University and University of Pittsburgh.

D'Mello, P., Tawatnuntachai, O., Yaman, D., 2003. Does the sequence of seasoned equity offerings matter? *Financial Management 32*, 59-86.

Dougherty, C., 2002. Introduction to econometrics, 2nd edition. Oxford University Press, New York.

Eckbo, B., Masulis, R., 1992. Adverse selection and rights offer paradox. *Journal of Financial Economics 32*, 293-322.

Eckbo, B., Masulis, R., Norli, O., 2000. Seasoned public offerings: Resolution of the 'new issues puzzle'. *Journal of Financial Economics 56*, 251-291.

Eckbo, B., Masulis, R., Norli, O., 2007. Security offerings. In: Eckbo, B. (Ed.), Handbook of corporate finance: Empirical corporate finance, Vol. 1. In: Handbooks in Finance Series. Elsevier/North Holland Co., Amsterdam.

Eckbo, B., Norli, O., 2005. Liquidity risk, leverage and long-run IPO returns. *Journal of Corporate Finance 11*, 1-35.

Elliott, W., Koëter-Kant, J., Warr, R., 2007. A valuation-based test of market timing. *Journal of Corporate Finance 13*, 112-128.

Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics 33*, 3-56.

Fama, E., 1998. Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics 49*, 283-306.

Fama E., French, K., 1998. Taxes, financing decisions and firm value. *The Journal of Finance 53*, 819-843.

Fama, E., French, K., 2001. Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics 60*, 3-43.

Fama, E., French, K., 2002. Testing the pecking order predictions about dividends and debt. *Review of Financial Studies 15*, 1-33.

Fama E., French, K., 2005. Financing decisions: who issues stock? *Journal of Financial Economics 76*, 549-582.

Fama, E., French, K., 2006. Dissecting anomalies. Unpublished working paper, University of Chicago.

Frank, M., Goyal, V., 2003. Testing the pecking order theory of capital structure. *Journal of Financial Economics 67*, 217-248.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics 60*, 187-243.

Guenther, D., Young, D., 2000. The association between financial accounting measures and real economic activity: A multinational study. *Journal of Accounting and Economics 29*, 53-72.

Hansen, R., Crutchley, C., 1990. Corporate earnings and financings: An empirical analysis. *Journal of Business 63*, 347-371.

Helwege J., Liang, N., 1996. Is there a pecking order? Evidence from a panel of IPO firms. *Journal of Financial Economics 40*, 429-458.

Heron, R., Lie, E., 2004. A comparison of the motivations for and the information content of different types of equity offerings. *Journal of Business 77*, 605-632.

Hertzel, M., Li, Z., 2007. Behavioral and rational explanations of stock price performance around SEOs: Evidence from a decomposition of market-to-book ratios. Unpublished working paper, Arizona State University.

Horowitz, J., 1994. Bootstrap based critical values for the information matrix test. *Journal of Econometrics 61*, 395-411.

Hovakimian, A., Opler, T., Titman, S., 2001. The debt-equity choice. *The Journal of Financial and Quantitative Analysis 36*, 1-24.

Huang, S., Song, F., 2003. The determinants of capital structure: Evidence from China. *China Economic Review 17*, 14-36.

Jaffe, J., 1974. Special information and insider trading. *Journal of Business 47*, 411-428.

Jegadeesh, N., 2000. Long-run performance of seasoned equity offerings: Benchmark errors and biases in expectations. *Financial Management 29*, 5-30.

Jegadeesh, N., Weinstein, M., Welch, I., 1993. An empirical investigation of IPO returns and subsequent equity offerings. *Journal of Financial Economics 34*, 153-175.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review 76*, 323-329.

Jenter, D., 2005. Market timing and managerial portfolio decisions. *The Journal of Finance 60*, 1903-1949.

Jung, K., Kim, Y., Stulz, R., 1996. Timing, investment opportunities, managerial discretion, and the security issue decision. *Journal of Financial Economics 42*, 159-185.

Kaplan, S., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? *Quarterly Journal of Economics 112*, 169-215.

Kahle, K., 2000. Insider trading and the long-run performance of new security issues. *Journal of Corporate Finance 6*, 25-53.

Kalay, A., Shimrat, A., 1987. Firm value and seasoned equity issues: Price pressure, wealth redistribution, or negative information. *Journal of Financial Economics 19*, 109-126.

Kester, C., 1986. Capital and ownership structure: A comparison of United States and Japanese manufacturing corporations. *Financial Management 15*, 5-16.

Kim, W., Weisbach, M., 2007. Motivations for public equity offers: An international perspective. Forthcoming. *Journal of Financial Economics.*

Korajczyk, R., Lucas, D., MacDonald, R., 1990. Understanding stock price behavior around the time of equity issues. In: Hubbard, R. (Ed.), Asymmetric information, Corporate Finance and Investment. University of Chicago Press, Chicago.

Korajczyk, R., Lucas, D., MacDonald, R., 1991. The effects of information releases on the pricing and timing of equity issues. *Review of Financial Studies 4*, 685-708.

Kothari, S., Warner, J., 2007. Econometrics of event studies. In: Eckbo, B. (Ed.), Handbook of corporate finance: Empirical corporate finance, Vol. 1. In: Handbooks in Finance Series. Elsevier/North Holland Co., Amsterdam.

Krishnamurthy, S., Spindt, P., Subramaniam, V., Woidtke, T., 2005. Does investor identity matter in equity issues? Evidence from private placements. *Journal of Financial Intermediation 14*, 210-238.

Krishnaswami, S., Subramaniam, V., 1999. Information asymmetry, valuation, and corporate spinoff decisions. *Journal of Financial Economics 53*, 73-112.

Lee, C., Myers, J., Swaminathan, B., 1999. What is the intrinsic value of the dow? *The Journal of Finance 54*, 1693-1741.

Lee, I., 1997. Do firms knowingly sell overvalued equity? *The Journal of Finance 52*, 1439-1466.

Li, K., Prabhala, N., 2007. Self-selection models in corporate finance. In: Eckbo, B. (Ed.), Handbook of corporate finance: Empirical corporate finance, Vol. 1. In: Handbooks in Finance Series. Elsevier/North Holland Co., Amsterdam.

Li, X., Zhao, X., 2006. Propensity score matching and abnormal performance after seasoned equity offerings. *Journal of Empirical Finance 13*, 351-370.

Loderer, C., Cooney, J., Van Drunen, L., 1991. The price elasticity of demand for common stock. *The Journal of Finance 46*, 621-651.

Loughran, T., Ritter, J., 1995. The new issues puzzle. *The Journal of Finance 50*, 23-51.

Loughran, T., Ritter, J., 1997. The operating performance of firms conducting seasoned equity offerings. *The Journal of Finance 52*, 1823-1850.

Loughran, T., Ritter, J., 2000. Uniformly least powerful tests of market efficiency. *Journal of Financial Economics 55*, 361-389.

Lucas, D., MacDonald, R., 1990. Equity issues and stock price dynamics. *The Journal of Finance 45*, 1019-1043.

Lyandres, E., Sun, L., Zhang, L., 2005. Investment-based underperformance following seasoned equity offerings. Unpublished working paper, University of Rochester.

Lyon, J., Barber, B., Tsai, C., 1999. Improved methods of tests of long-horizon abnormal stock returns. *The Journal of Finance 54*, 165-201.

Mackie-Mason, J., 1990. Do taxes affect corporate financing decisions? *The Journal of Finance 45*, 1471-1493.

Mandelker, G., 1974. Risk and return: The case of merging firms. *Journal of Financial Economics 1*, 303-335.

Marsh, P., 1982. The choice between equity and debt: An empirical study. *The Journal of Finance 37*, 121-144.

Masulis, R., Korwar, A., 1986. Seasoned equity offerings: An empirical investigation. *Journal of Financial Economics 15*, 91-118.

Miller, M., 1997. Risk, uncertainty and divergence of opinion. *The Journal of Finance 32*, 1151-1168.

Miller, M., Scholes, M., 1978. Dividends and taxes. *Journal of Financial Economics 6*, 333–364.

Mikkelson, W., Partch, M., 1986. Valuation effects of security offerings and the issuance process. *Journal of Financial Economics 15*, 30-60.

Mitchell, M., Stafford, E., 2000. Managerial decisions and long-term stock price performance. *Journal of Business 73*, 287-329.

Modigliani, F., Miller, M., 1958. The cost of capital, corporation finance, and the theory of investment. *American Economic Review 48*, 655-669.

Modigliani, F., Miller, M., 1963. Corporate income taxes and the cost of capital: A correction. *American Economic Review 53*, 433-443.

Moore, G., Peterson, D., Peterson, P., 1986. Shelf registrations and shareholder wealth: A comparison of shelf and traditional equity offerings. *The Journal of Finance 41*, 451-463.

Myers, S., 1984. The capital structure puzzle, The *Journal of Finance 39*, 575-592.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics 13*, 187-221.

Opler, T., Titman, S., 1993. The determinants of leveraged buyout activity: Free cash flow vs. financial distress costs. *The Journal of Finance 48*, 1985-1999.

Pilotte, E., 1992. Growth opportunities and the stock price response to new financing. *Journal of Business 65*, 371-394.

Rajan, R., Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. *The Journal of Finance 50*, 1421-1460.

Rangan, S., 1998. Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics 50*, 101-122.

Rhodes-Kropf, M., Robinson, D., Viswanathan, S., 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics 77*, 561-603.

Rosen, R., 2006. Merger momentum and investor sentiment: The stock market reaction to merger announcements. *Journal of Business 79*, 987-1017.

Rosenbaum, P., Rubin, D., 1983. The central role of the propensity score in observational studies for casual effects. *Biometrika 70*, 41-55.

Schleifer, A., Vishny, R., 2003. Stock market driven acquisitions. *Journal of Financial Economics 70*, 295-312.

Schultz, P., 2003. Pseudo market timing and the long-run underperformance of IPOs. The Journal of Finance 58, 483-517.

Schultz, P., 2004. Pseudo market timing and the stationarity of the event-generating process. Unpublished working paper, University of Notre Dame.

Schwert, G., 1989. Why does stock market volatility change over time? *The Journal of Finance 44*, 1115-1153.

Shapiro, M., Blanchard, O., Lovell, M., 1986. Investment, output, and the cost of capital. *Brookings Papers 1:1986*, 111-164.

Shivakumar, L., 1999. Do firms mislead investors by overstating earnings before seasoned equity offerings? *Journal of Accounting and Economics 29*, 339-371.

Shyam-Sunder L., Myers, S., 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics 51*, 219-244.

Slovin, M., Sushka, M., Bendeck, Y., 1994. Seasoned common stock issuance following an IPO. *Journal of Banking and Finance 18*, 207-226.

Spiess, D., Affleck-Graves, J., 1995. Underperformance in long-run stock returns following seasoned equity offerings. *Journal of Financial Economics 38*, 243-267.

Titman, S., Wei, K., Xie, F., 2004. Capital investments and stock returns. *The Journal of Financial and Quantitative Analysis 39*, 677-700.

Titman, S., Wessels, R., 1988. The determinants of capital structure choice. *The Journal of Finance 43*, 1-19.

Viswanathan, S., Wei, B., 2004. Endogenous events and long-run returns. Unpublished working paper, Duke University.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test of heteroskedasticity. *Econometrica 48*, 817-838.

Zhang, L., 2005. Anomalies. Unpublished working paper, University of Rochester.

Zwiebel, J., 1996. Dynamic capital structure under managerial entrenchment. *American Economic Review 86*, 1197-1215.

Appendix A1: Accounting multiples from fundamental value regression (Model 1)

The table reports the multiples from fundamental value regression. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The dependent variable is the natural logarithm of market value. The independent variable is the natural logarithm of book value of equity. The regression is estimated cross-sectionally at the industry-year level for each of the industries. Specifically, the results are based on Equation 20, that is, $m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \varepsilon_{it}$.

		Coefficients	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Food	α_0	Intercept	0.4	0.3	0.6	0.8	1.0	0.0	0.3	0.1	-0.5	-0.3	0.2	0.5	0.5	1.0	0.8	0.6	0.7	0.9	0.8	0.9	0.3	1.0	1.7	1.9	1.4	0.6	0.6
	b	Book equity	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.8	0.9	1.1	1.0
	R^2	*Goodness of fit*	*0.87*	*0.88*	*0.88*	*0.87*	*0.87*	*0.85*	*0.88*	*0.88*	*0.91*	*0.88*	*0.90*	*0.85*	*0.88*	*0.84*	*0.85*	*0.83*	*0.82*	*0.77*	*0.80*	*0.77*	*0.87*	*0.83*	*0.82*	*0.80*	*0.85*	*0.88*	
Recreation	α_0	Intercept	0.3	0.6	0.9	-0.1	0.2	-0.1	0.5	0.8	0.4	-0.3	-0.3	0.8	0.8	0.9	0.8	0.7	0.9	1.7	0.7	1.1	0.6	1.5	1.7	1.5	1.8	1.9	0.8
	b	Book equity	1.0	1.0	0.9	1.2	1.1	1.1	1.0	1.0	0.9	1.1	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.7	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.8	1.0
	R^2	*Goodness of fit*	*0.94*	*0.90*	*0.73*	*0.87*	*0.86*	*0.86*	*0.84*	*0.80*	*0.69*	*0.74*	*0.76*	*0.78*	*0.79*	*0.80*	*0.83*	*0.73*	*0.72*	*0.60*	*0.66*	*0.67*	*0.80*	*0.77*	*0.78*	*0.87*	*0.80*	*0.84*	
Publishing	α_0	Intercept	-0.2	2.2	1.6	1.2	0.8	0.5	0.8	0.3	-0.1	-0.1	0.2	0.8	0.8	0.7	0.8	0.7	0.9	0.8	0.4	0.0	1.4	1.7	1.5	0.6	0.6	0.7	0.8
	b	Book equity	1.2	0.8	0.9	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.1	0.9	0.9	0.9	1.1	1.0	1.0	1.0
	R^2	*Goodness of fit*	*0.85*	*0.66*	*0.77*	*0.83*	*0.86*	*0.87*	*0.87*	*0.92*	*0.89*	*0.91*	*0.89*	*0.91*	*0.91*	*0.91*	*0.89*	*0.90*	*0.88*	*0.80*	*0.85*	*0.84*	*0.78*	*0.76*	*0.86*	*0.89*	*0.89*	*0.89*	
Consumer goods	α_0	Intercept	-0.4	0.2	-0.1	0.1	0.0	0.0	0.4	-0.2	0.0	0.1	0.5	0.3	0.5	0.4	0.3	0.0	-0.1	0.3	0.2	0.2	0.4	0.1	0.9	1.1	1.1	1.1	0.3
	b	Book equity	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.2	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.1	1.0	1.2	1.0	0.9	0.9	1.0	1.1
	R^2	*Goodness of fit*	*0.90*	*0.94*	*0.93*	*0.93*	*0.94*	*0.84*	*0.84*	*0.90*	*0.88*	*0.86*	*0.84*	*0.88*	*0.84*	*0.83*	*0.78*	*0.89*	*0.86*	*0.79*	*0.77*	*0.76*	*0.71*	*0.81*	*0.82*	*0.81*	*0.75*	*0.79*	
Apparel	α_0	Intercept	0.6	0.8	0.0	-0.5	0.5	0.0	0.2	-0.5	-1.0	-1.3	-0.5	0.5	0.3	0.2	0.0	1.0	0.9	0.4	-0.8	-0.5	-0.6	-1.1	-0.3	1.6	2.6	1.0	0.1
	b	Book equity	0.9	0.9	1.1	1.2	1.0	1.1	1.1	1.2	1.3	1.4	1.3	1.1	1.1	1.1	1.1	1.1	0.9	0.9	1.0	1.2	1.1	1.2	1.3	1.2	0.8	0.7	1.0	1.1
	R^2	*Goodness of fit*	*0.63*	*0.82*	*0.82*	*0.78*	*0.68*	*0.84*	*0.85*	*0.90*	*0.87*	*0.89*	*0.92*	*0.89*	*0.86*	*0.83*	*0.81*	*0.80*	*0.70*	*0.74*	*0.77*	*0.80*	*0.70*	*0.73*	*0.78*	*0.80*	*0.67*	*0.79*	
Healthcare	α_0	Intercept	1.7	1.7	1.0	1.3	1.0	1.3	1.5	1.6	1.2	2.3	1.8	1.8	1.2	1.8	1.5	1.5	1.3	1.8	1.4	1.6	1.4	2.1	2.1	2.3	1.9	1.5	1.6
	b	Book equity	0.9	0.9	1.0	1.0	1.0	0.9	0.9	0.9	1.0	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.9	0.9	0.9
	R^2	*Goodness of fit*	*0.91*	*0.92*	*0.93*	*0.93*	*0.92*	*0.86*	*0.86*	*0.85*	*0.84*	*0.78*	*0.83*	*0.82*	*0.84*	*0.77*	*0.78*	*0.75*	*0.69*	*0.61*	*0.67*	*0.74*	*0.74*	*0.70*	*0.81*	*0.74*	*0.80*	*0.86*	
Chemicals	α_0	Intercept	0.6	0.8	0.3	0.3	0.3	0.6	1.0	1.6	1.0	0.9	2.0	1.3	0.6	0.4	0.5	0.5	0.9	0.9	1.1	0.9	0.6	1.3	1.7	1.7	1.7	1.6	1.0
	b	Book equity	0.9	0.9	1.0	1.0	1.1	1.0	0.9	0.9	0.9	1.0	0.8	0.9	1.0	1.1	1.1	1.1	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0
	R^2	*Goodness of fit*	*0.94*	*0.94*	*0.93*	*0.94*	*0.95*	*0.91*	*0.89*	*0.82*	*0.82*	*0.87*	*0.83*	*0.89*	*0.85*	*0.88*	*0.88*	*0.89*	*0.86*	*0.81*	*0.80*	*0.83*	*0.76*	*0.85*	*0.88*	*0.86*	*0.89*	*0.88*	
Building	α_0	Intercept	0.4	0.6	0.3	0.2	0.2	0.0	0.1	0.1	-1.0	-0.6	-0.3	-0.2	0.1	0.2	0.0	0.6	0.6	0.7	0.2	0.5	0.0	0.4	1.2	1.0	1.2	0.3	0.3
	b	Book equity	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.1	1.2	1.2	1.1	1.2	1.0	1.1	1.1	1.0	1.0	0.9	1.0	0.9	1.0	1.0	0.9	1.0	0.9	1.0	1.0
	R^2	*Goodness of fit*	*0.83*	*0.87*	*0.88*	*0.90*	*0.84*	*0.81*	*0.81*	*0.78*	*0.82*	*0.87*	*0.86*	*0.84*	*0.85*	*0.85*	*0.85*	*0.82*	*0.81*	*0.79*	*0.77*	*0.80*	*0.81*	*0.83*	*0.84*	*0.89*	*0.88*	*0.94*	
Steel works	α_0	Intercept	0.1	0.5	0.3	0.5	0.7	0.0	1.2	0.0	-0.9	0.2	1.4	1.4	1.1	1.1	0.8	1.2	0.8	0.5	0.0	-0.4	0.8	1.0	1.1	0.9	1.4	1.4	0.7
	b	Book equity	1.0	0.9	0.9	0.9	0.9	1.0	0.9	1.0	1.1	1.0	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.1	0.8	0.9	0.9	1.0	0.9	0.9	0.9
	R^2	*Goodness of fit*	*0.80*	*0.84*	*0.84*	*0.86*	*0.85*	*0.91*	*0.88*	*0.90*	*0.85*	*0.76*	*0.87*	*0.71*	*0.85*	*0.81*	*0.79*	*0.77*	*0.81*	*0.77*	*0.66*	*0.79*	*0.64*	*0.73*	*0.86*	*0.89*	*0.76*	*0.71*	
Manufacturing	α_0	Intercept	0.1	0.5	0.9	1.1	0.5	0.2	0.5	0.3	-0.1	0.3	0.4	0.3	0.8	0.7	0.2	0.4	0.2	0.4	0.3	0.4	0.3	1.1	1.6	1.2	1.1	0.7	0.6
	b	Book equity	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.8	0.9	1.0	1.0	1.0
	R^2	*Goodness of fit*	*0.88*	*0.89*	*0.89*	*0.87*	*0.88*	*0.91*	*0.92*	*0.90*	*0.89*	*0.90*	*0.86*	*0.88*	*0.82*	*0.82*	*0.87*	*0.86*	*0.82*	*0.81*	*0.78*	*0.76*	*0.81*	*0.78*	*0.80*	*0.83*	*0.87*	*0.92*	
Electrical equipment	α_0	Intercept	1.0	1.8	1.8	0.3	0.2	0.5	0.9	1.7	1.0	1.3	1.5	1.1	1.7	1.7	1.1	1.2	1.5	1.9	0.9	1.6	-0.2	0.5	1.5	2.1	1.7	0.5	1.2
	b	Book equity	0.8	0.7	0.6	1.0	1.0	0.9	0.9	0.7	0.8	0.8	0.8	0.9	0.8	0.8	1.0	0.9	0.8	0.7	1.0	0.7	1.1	1.1	0.9	0.8	0.8	1.1	0.9
	R^2	*Goodness of fit*	*0.34*	*0.64*	*0.57*	*0.76*	*0.86*	*0.81*	*0.82*	*0.70*	*0.58*	*0.63*	*0.68*	*0.76*	*0.71*	*0.70*	*0.82*	*0.81*	*0.71*	*0.47*	*0.66*	*0.67*	*0.84*	*0.82*	*0.75*	*0.75*	*0.83*	*0.90*	
Automobiles	α_0	Intercept	0.4	0.5	0.5	0.9	0.6	0.4	0.5	0.3	0.0	0.1	0.6	0.5	0.4	0.8	1.2	1.0	1.4	0.8	1.7	0.5	1.3	1.6	2.0	1.9	1.7	1.2	0.9
	b	Book equity	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.1	1.0	0.9	1.0	0.8	0.9	0.7	1.0	0.8	0.8	0.8	0.8	0.8	0.9	0.9
	R^2	*Goodness of fit*	*0.90*	*0.92*	*0.94*	*0.91*	*0.92*	*0.91*	*0.91*	*0.88*	*0.86*	*0.81*	*0.80*	*0.89*	*0.89*	*0.89*	*0.81*	*0.89*	*0.79*	*0.84*	*0.68*	*0.82*	*0.81*	*0.81*	*0.81*	*0.74*	*0.80*	*0.81*	
Aircraft	α_0	Intercept	0.7	1.1	0.3	0.2	0.1	0.6	0.5	0.3	0.1	0.2	0.2	-0.4	0.5	0.3	0.5	1.0	0.6	0.7	-0.2	0.3	0.7	1.4	1.3	1.6	0.7	0.3	0.5
	b	Book equity	0.9	0.9	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.0	1.0	0.9	0.9	0.9	1.1	1.1	1.0
	R^2	*Goodness of fit*	*0.91*	*0.94*	*0.95*	*0.98*	*0.97*	*0.81*	*0.87*	*0.95*	*0.96*	*0.93*	*0.91*	*0.94*	*0.84*	*0.89*	*0.89*	*0.91*	*0.90*	*0.82*	*0.91*	*0.89*	*0.89*	*0.86*	*0.90*	*0.85*	*0.94*	*0.96*	
Mining	α_0	Intercept	1.1	1.3	1.4	1.3	1.2	-0.1	-0.4	-0.7	-0.4	0.2	1.7	1.8	1.8	1.6	0.4	0.6	0.7	1.1	1.5	1.6	2.4	2.6	2.8	3.1	2.8	2.7	1.5
	b	Book equity	0.9	0.8	0.8	0.8	0.9	1.1	1.2	1.3	1.2	1.1	0.8	0.9	0.8	0.9	1.1	1.0	0.9	0.9	0.7	0.6	0.5	0.7	0.6	0.5	0.7	0.7	0.9
	R^2	*Goodness of fit*	*0.74*	*0.76*	*0.75*	*0.58*	*0.52*	*0.72*	*0.86*	*0.78*	*0.69*	*0.65*	*0.64*	*0.66*	*0.77*	*0.82*	*0.87*	*0.93*	*0.79*	*0.74*	*0.61*	*0.58*	*0.40*	*0.74*	*0.54*	*0.63*	*0.71*	*0.73*	
Fuels	α_0	Intercept	1.0	1.1	0.7	0.7	0.9	0.8	0.5	1.3	0.9	0.6	0.7	0.5	0.9	0.9	0.9	1.5	0.7	1.2	1.3	1.1	0.6	1.6	1.7	2.2	1.7	0.9	1.0
	b	Book equity	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.9	1.0	0.9
	R^2	*Goodness of fit*	*0.95*	*0.94*	*0.91*	*0.90*	*0.87*	*0.87*	*0.89*	*0.82*	*0.89*	*0.89*	*0.86*	*0.92*	*0.86*	*0.87*	*0.90*	*0.85*	*0.83*	*0.84*	*0.81*	*0.81*	*0.80*	*0.75*	*0.79*	*0.76*	*0.77*	*0.95*	
Communication	α_0	Intercept	1.2	1.1	1.0	1.3	1.3	1.3	1.0	1.5	1.7	1.2	1.3	1.2	2.0	1.8	2.1	2.0	1.9	2.3	2.5	1.3	2.1	1.4	2.3	2.5	1.4	2.0	1.1
	b	Book equity	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.8	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.7	0.8	0.7	0.7	0.9	0.8	0.9
	R^2	*Goodness of fit*	*0.86*	*0.93*	*0.92*	*0.91*	*0.93*	*0.88*	*0.86*	*0.85*	*0.86*	*0.82*	*0.88*	*0.87*	*0.87*	*0.85*	*0.79*	*0.84*	*0.76*	*0.77*	*0.73*	*0.76*	*0.75*	*0.77*	*0.74*	*0.83*	*0.83*	*0.93*	
Services	α_0	Intercept	1.6	1.9	1.5	1.8	1.4	0.7	0.7	0.8	0.2	0.9	1.1	0.9	1.0	1.5	1.3	1.7	1.7	2.3	1.5	1.3	1.2	2.0	2.1	2.0	1.8	1.4	1.4
	b	Book equity	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9
	R^2	*Goodness of fit*	*0.70*	*0.80*	*0.84*	*0.75*	*0.72*	*0.73*	*0.76*	*0.73*	*0.68*	*0.67*	*0.69*	*0.76*	*0.76*	*0.74*	*0.74*	*0.73*	*0.70*	*0.61*	*0.62*	*0.70*	*0.72*	*0.75*	*0.78*	*0.77*	*0.78*	*0.84*	
Business equipment	α_0	Intercept	1.3	1.2	0.9	1.2	1.1	0.4	0.5	0.5	0.0	0.4	0.8	1.0	0.8	1.4	1.0	1.2	0.8	1.5	0.8	0.9	0.5	1.2	1.5	1.3	1.3	0.9	0.9
	b	Book equity	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0
	R^2	*Goodness of fit*	*0.84*	*0.88*	*0.88*	*0.89*	*0.81*	*0.86*	*0.87*	*0.83*	*0.82*	*0.79*	*0.79*	*0.78*	*0.80*	*0.74*	*0.81*	*0.80*	*0.79*	*0.72*	*0.76*	*0.79*	*0.77*	*0.79*	*0.84*	*0.84*	*0.84*	*0.91*	
Business supplies	α_0	Intercept	0.5	0.9	0.8	1.0	0.7	0.1	0.6	0.5	0.5	0.3	0.6	0.4	0.5	0.7	0.9	1.0	1.4	1.4	0.6	0.4	-0.4	0.5	1.6	1.0	1.4	1.1	0.7
	b	Book equity	0.9	0.9	0.9	0.9	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	0.9	0.8	0.9	1.0	1.1	1.0	0.9	1.0	0.9	1.0	1.0
	R^2	*Goodness of fit*	*0.87*	*0.90*	*0.91*	*0.89*	*0.91*	*0.90*	*0.90*	*0.88*	*0.88*	*0.91*	*0.88*	*0.91*	*0.92*	*0.92*	*0.88*	*0.85*	*0.85*	*0.85*	*0.84*	*0.89*	*0.94*	*0.92*	*0.89*	*0.91*	*0.83*	*0.92*	
Transportation	α_0	Intercept	-0.1	0.5	0.2	0.1	0.3	0.3	0.6	0.9	0.0	0.5	1.0	1.2	0.7	0.5	0.6	0.6	0.3	1.0	0.5	0.2	0.6	1.1	1.2	1.2	1.5	0.8	0.6
	b	Book equity	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0	1.0
	R^2	*Goodness of fit*	*0.88*	*0.87*	*0.90*	*0.92*	*0.85*	*0.89*	*0.87*	*0.92*	*0.92*	*0.91*	*0.84*	*0.82*	*0.88*	*0.87*	*0.87*	*0.91*	*0.87*	*0.72*	*0.77*	*0.84*	*0.78*	*0.83*	*0.85*	*0.88*	*0.86*	*0.89*	
Wholesale	α_0	Intercept	0.2	0.4	0.2	0.5	0.6	0.2	0.3	0.2	-0.1	0.2	1.2	0.6	0.7	0.8	0.9	0.5	1.0	0.9	1.1	0.7	0.8	0.6	0.9	1.1	1.6	1.4	1.2
	b	Book equity	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	1.0
	R^2	*Goodness of fit*	*0.80*	*0.84*	*0.89*	*0.90*	*0.85*	*0.84*	*0.85*	*0.81*	*0.80*	*0.65*	*0.74*	*0.77*	*0.81*	*0.80*	*0.81*	*0.79*	*0.76*	*0.73*	*0.67*	*0.68*	*0.71*	*0.75*	*0.75*	*0.78*	*0.82*	*0.81*	
Retail	α_0	Intercept	0.3	1.6	0.8	0.8	0.6	0.1	0.4	0.1	-0.8	-0.2	0.2	0.5	0.3	0.0	0.2	0.5	0.5	0.9	-0.5	-0.1	0.2	0.8	1.0	1.3	0.7	0.6	0.4
	b	Book equity	1.0	0.8	1.0	1.0	1.0	1.1	1.0	1.1	1.2	1.2	1.1	1.1	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	0.9	1.0	1.0	1.0
	R^2	*Goodness of fit*	*0.82*	*0.73*	*0.85*	*0.85*	*0.86*	*0.87*	*0.87*	*0.88*	*0.89*	*0.86*	*0.84*	*0.83*	*0.82*	*0.80*	*0.81*	*0.79*	*0.76*	*0.72*	*0.73*	*0.78*	*0.80*	*0.76*	*0.84*	*0.84*	*0.90*	*0.89*	
Restaurants & Hotels	α_0	Intercept	0.7	1.1	0.9	1.1	-0.1	-0.4	0.7	0.6	-0.5	0.3	1.6	1.3	0.4	1.4	1.2	0.5	0.3	0.9	0.1	0.4	0.4	0.9	1.3	1.6	0.9	1.2	0.7
	b	Book equity	1.0	0.9	1.0	0.9	1.2	1.2	1.0	1.0	1.2	1.1	0.9	1.0	1.1	0.9	0.9	1.0	1.0	0.9	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0
	R^2	*Goodness of fit*	*0.87*	*0.86*	*0.87*	*0.82*	*0.88*	*0.87*	*0.89*	*0.88*	*0.83*	*0.73*	*0.73*	*0.76*	*0.83*	*0.72*	*0.74*	*0.84*	*0.81*	*0.74*	*0.82*	*0.77*	*0.81*	*0.72*	*0.81*	*0.79*	*0.90*	*0.88*	
Other	α_0	Intercept	-1.1	-0.2	2.0	0.2	0.4	-0.5	0.6	0.4	0.1	1.5	0.8	0.8	0.5	1.2	1.1	1.1	1.3	1.7	0.3	-0.2	1.1	1.5	2.5	2.1	1.8	1.3	0.9
	b	Book equity	1.3	1.1	1.0	1.1	1.1	1.2	1.0	1.1	1.1	0.8	1.0	1.0	1.0	0.8	0.9	0.9	0.8	0.7	0.9	1.1	0.8	0.8	0.7	0.8	0.8	0.9	0.9
	R^2	*Goodness of fit*	*0.89*	*0.81*	*0.60*	*0.84*	*0.85*	*0.87*	*0.83*	*0.71*	*0.70*	*0.59*	*0.71*	*0.75*	*0.70*	*0.64*	*0.72*	*0.72*	*0.73*	*0.63*	*0.59*	*0.61*	*0.74*	*0.70*	*0.55*	*0.63*	*0.68*	*0.66*	

Appendix A2: Accounting multiples from fundamental value regression (Model 2)

The table reports the multiples from fundamental value regression. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The dependent variable is the natural logarithm of market value. The independent variables are the natural logarithm of book value of equity, the natural logarithm of the absolute value of net income, and a dummy variable indicating when the net income is negative. The regression is estimated cross-sectionally at the industry-year level for each of the industries. Specifically, the results are based on Equation 21, that is,

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{abs} + \alpha_{3jt} ni_{it}^{-} + \varepsilon_{it}\cdot$$

Industry		Coefficients	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Food	α_0	Intercept	2.4	1.9	2.2	2.7	1.7	1.7	1.9	1.1	0.4	1.0	1.2	1.3	1.4	2.5	1.8	1.8	1.4	1.7	1.4	1.6	0.9	2.0	2.5	2.6	2.6	2.8	1.8
	b	Book equity	0.1	0.3	0.3	0.1	0.7	0.3	0.4	0.6	0.9	0.7	0.6	0.7	0.7	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.7	0.5	0.4	0.3	0.4	0.3	0.5
	ni^{abs}	Absolute net income	0.8	0.7	0.7	0.9	0.3	0.8	0.7	0.5	0.4	0.5	0.5	0.4	0.3	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.7	0.6
	ni^-	Negative net income	-1.3	-0.3	-0.7	-0.2	-0.4	-0.2	-0.4	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.1	-0.2	-0.2	-0.5	-0.5	-0.4	-0.4	-0.2	-0.3	-0.3	-0.1	0.0	-0.3
	R^2	*Goodness of fit*	*0.93*	*0.93*	*0.94*	*0.95*	*0.91*	*0.94*	*0.96*	*0.94*	*0.93*	*0.94*	*0.95*	*0.94*	*0.93*	*0.92*	*0.94*	*0.89*	*0.89*	*0.87*	*0.90*	*0.87*	*0.92*	*0.90*	*0.90*	*0.90*	*0.93*	*0.96*	
Recreation	α_0	Intercept	1.3	0.9	1.0	0.9	1.1	0.7	1.5	1.0	1.4	-0.3	0.5	1.3	1.4	1.3	1.2	1.1	1.2	1.9	1.0	1.2	0.9	1.8	1.9	1.7	2.1	2.2	1.2
	b	Book equity	0.5	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.2	0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.4	0.6	0.5	0.7	0.5	0.6	0.7	0.6	0.6	0.7
	ni^{abs}	Absolute net income	0.5	0.2	0.4	0.4	0.4	0.4	0.3	0.4	0.9	0.5	0.4	0.4	0.3	0.2	0.2	0.3	0.3	0.6	0.5	0.6	0.4	0.5	0.5	0.3	0.4	0.3	0.4
	ni^-	Negative net income	-0.1	0.2	0.3	-0.5	-0.2	-0.3	-0.5	-0.2	-0.4	-0.3	-0.6	-0.3	-0.2	-0.1	-0.1	-0.2	-0.3	-0.4	-0.5	-0.5	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	-0.2
	R^2	*Goodness of fit*	*0.97*	*0.92*	*0.92*	*0.93*	*0.89*	*0.89*	*0.91*	*0.87*	*0.84*	*0.82*	*0.85*	*0.83*	*0.82*	*0.83*	*0.85*	*0.77*	*0.76*	*0.71*	*0.73*	*0.76*	*0.84*	*0.83*	*0.83*	*0.89*	*0.84*	*0.85*	
Publishing	α_0	Intercept	2.7	3.3	2.5	2.7	2.6	2.4	1.3	1.0	0.5	0.9	0.6	1.1	2.2	1.3	2.0	1.3	1.3	1.3	0.8	0.7	1.8	2.4	2.2	1.2	1.2	1.2	1.6
	b	Book equity	-0.3	-0.2	0.0	-0.1	0.0	0.0	0.7	0.7	0.8	0.6	0.9	0.8	0.3	0.7	0.4	0.7	0.6	0.6	0.6	0.6	0.4	0.2	0.5	0.8	0.8	0.7	0.5
	ni^{abs}	Absolute net income	1.4	1.1	1.0	1.2	1.0	1.0	0.3	0.4	0.3	0.6	0.3	0.2	0.7	0.4	0.6	0.4	0.5	0.5	0.5	0.7	0.7	0.8	0.5	0.2	0.3	0.4	0.6
	ni^-	Negative net income	0.0	-5.5	0.0	0.0	-0.4	0.0	0.3	0.0	0.2	-0.1	0.0	-0.1	-0.3	-0.1	0.2	0.0	-0.4	-0.5	0.1	-0.3	-0.3	0.0	0.1	0.1	0.0	-0.2	-0.3
	R^2	*Goodness of fit*	*0.98*	*0.87*	*0.93*	*0.96*	*0.93*	*0.95*	*0.96*	*0.93*	*0.94*	*0.98*	*0.91*	*0.93*	*0.96*	*0.93*	*0.95*	*0.93*	*0.91*	*0.85*	*0.92*	*0.92*	*0.89*	*0.90*	*0.94*	*0.91*	*0.90*	*0.91*	
Consumer goods	α_0	Intercept	1.1	0.6	0.6	1.1	0.8	0.9	1.2	0.2	0.7	0.8	0.9	1.3	1.9	1.5	1.7	0.4	0.8	1.1	0.9	1.0	1.2	1.0	1.8	1.6	1.8	2.1	1.1
	b	Book equity	0.6	0.9	0.8	0.7	0.7	0.7	0.7	1.1	0.8	0.9	1.0	0.7	0.4	0.6	0.6	0.9	0.7	0.5	0.5	0.5	0.6	0.7	0.4	0.5	0.5	0.4	0.7
	ni^{abs}	Absolute net income	0.4	0.1	0.3	0.4	0.4	0.4	0.3	0.0	0.3	0.3	0.1	0.5	0.7	0.5	0.4	0.3	0.5	0.6	0.6	0.7	0.5	0.5	0.7	0.7	0.6	0.7	0.4
	ni^-	Negative net income	-0.5	-0.2	-0.1	-0.1	-0.3	-0.5	-0.4	-0.3	-0.2	-0.3	-0.7	-0.5	-0.6	-0.3	-0.3	-0.1	-0.3	0.0	-0.4	-0.4	-0.6	-0.3	-0.3	-0.3	-0.5	-0.4	-0.3
	R^2	*Goodness of fit*	*0.95*	*0.95*	*0.97*	*0.95*	*0.98*	*0.88*	*0.86*	*0.92*	*0.89*	*0.89*	*0.91*	*0.93*	*0.92*	*0.88*	*0.82*	*0.91*	*0.90*	*0.87*	*0.86*	*0.88*	*0.80*	*0.85*	*0.92*	*0.91*	*0.85*	*0.93*	
Apparel	α_0	Intercept	1.9	2.0	0.7	1.0	1.8	1.5	1.1	1.5	0.7	1.0	1.0	2.3	1.2	1.0	0.7	1.8	1.6	1.4	0.4	0.1	-0.3	-0.9	-0.6	2.0	3.3	1.6	1.1
	b	Book equity	0.2	0.4	0.7	0.6	0.4	0.3	0.7	0.4	0.6	0.6	0.7	0.3	0.6	0.8	0.8	0.5	0.5	0.3	0.7	0.8	0.8	1.2	1.2	0.5	0.1	0.5	0.6
	ni^{abs}	Absolute net income	0.8	0.5	0.3	0.5	0.7	0.8	0.3	0.6	0.5	0.6	0.5	0.7	0.5	0.4	0.3	0.6	0.6	0.9	0.5	0.5	0.5	0.1	0.0	0.5	0.8	0.5	0.5
	ni^-	Negative net income	0.0	0.0	-0.1	-0.7	-0.8	3.1	-0.2	-0.1	-0.4	-0.3	-0.2	-0.2	-0.1	-0.3	-0.1	-0.4	-0.7	-0.5	-0.8	-0.4	0.2	0.1	0.3	-0.4	-0.3	0.0	-0.1
	R^2	*Goodness of fit*	*0.91*	*0.88*	*0.88*	*0.91*	*0.89*	*0.95*	*0.92*	*0.96*	*0.95*	*0.94*	*0.95*	*0.93*	*0.91*	*0.87*	*0.84*	*0.88*	*0.83*	*0.87*	*0.85*	*0.85*	*0.74*	*0.74*	*0.79*	*0.88*	*0.84*	*0.90*	
Healthcare	α_0	Intercept	2.3	2.1	1.8	1.8	1.7	2.0	2.2	2.2	1.7	2.7	2.7	2.4	1.8	2.3	2.1	1.9	1.5	2.0	1.6	1.8	1.6	2.2	2.2	2.4	2.0	1.7	2.0
	b	Book equity	0.5	0.7	0.6	0.7	0.7	0.5	0.4	0.5	0.6	0.5	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.7	0.6
	ni^{abs}	Absolute net income	0.3	0.2	0.3	0.2	0.3	0.5	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.3	0.4
	ni^-	Negative net income	0.4	-0.5	-0.4	-0.1	-0.3	-0.4	-0.2	-0.2	-0.3	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	-0.2
	R^2	*Goodness of fit*	*0.92*	*0.93*	*0.93*	*0.94*	*0.95*	*0.93*	*0.94*	*0.91*	*0.88*	*0.84*	*0.87*	*0.86*	*0.89*	*0.84*	*0.83*	*0.82*	*0.77*	*0.70*	*0.73*	*0.80*	*0.81*	*0.75*	*0.86*	*0.81*	*0.84*	*0.90*	
Chemicals	α_0	Intercept	1.4	1.5	1.6	0.9	0.6	1.6	2.2	1.7	1.8	1.4	2.5	1.7	1.6	1.1	1.4	1.0	1.4	1.4	1.4	1.1	1.0	1.6	2.0	2.2	1.8	1.8	1.5
	b	Book equity	0.6	0.6	0.4	0.8	1.0	0.6	0.3	0.5	0.5	0.7	0.4	0.6	0.5	0.7	0.7	0.7	0.6	0.5	0.5	0.8	0.7	0.5	0.6	0.5	0.6	0.6	0.6
	ni^{abs}	Absolute net income	0.4	0.4	0.6	0.3	0.0	0.4	0.7	0.6	0.5	0.3	0.6	0.4	0.6	0.4	0.4	0.4	0.5	0.6	0.5	0.3	0.4	0.5	0.3	0.4	0.3	0.4	0.4
	ni^-	Negative net income	-0.3	-0.2	-0.2	-0.2	-0.2	-0.4	-0.4	-0.1	-0.4	-0.4	0.0	-0.1	-0.2	0.0	-0.1	0.0	-0.1	-0.2	-0.6	-0.3	-0.4	-0.2	-0.1	-0.1	-0.1	-0.1	-0.2
	R^2	*Goodness of fit*	*0.95*	*0.96*	*0.97*	*0.95*	*0.97*	*0.93*	*0.94*	*0.93*	*0.93*	*0.92*	*0.93*	*0.92*	*0.93*	*0.91*	*0.92*	*0.92*	*0.90*	*0.87*	*0.87*	*0.86*	*0.80*	*0.90*	*0.90*	*0.90*	*0.92*	*0.94*	
Building	α_0	Intercept	1.0	1.3	0.9	1.0	0.8	0.8	0.7	1.1	0.2	-0.1	0.3	0.8	1.1	1.0	0.9	1.1	1.2	1.3	0.7	1.0	0.4	1.0	1.9	1.4	1.5	0.5	0.9
	b	Book equity	0.7	0.6	0.7	0.7	0.8	0.7	0.8	0.6	0.7	1.0	0.9	0.8	0.6	0.7	0.7	0.7	0.6	0.5	0.6	0.6	0.8	0.7	0.5	0.7	0.7	1.0	0.7
	ni^{abs}	Absolute net income	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.2	0.2	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.3	0.4	0.5	0.3	0.2	0.0	0.3
	ni^-	Negative net income	-0.2	0.0	-0.1	-0.2	0.1	-0.1	-0.1	-0.3	-0.5	-0.3	-0.3	-0.4	-0.2	-0.2	-0.1	0.0	-0.1	-0.3	-0.4	-0.4	-0.3	-0.2	0.0	-0.2	-0.3	-0.2	-0.2
	R^2	*Goodness of fit*	*0.87*	*0.91*	*0.90*	*0.92*	*0.88*	*0.84*	*0.83*	*0.84*	*0.87*	*0.91*	*0.89*	*0.89*	*0.91*	*0.90*	*0.91*	*0.87*	*0.87*	*0.85*	*0.84*	*0.86*	*0.84*	*0.86*	*0.89*	*0.91*	*0.90*	*0.94*	
Steel works	α_0	Intercept	-0.1	1.7	0.4	0.3	1.0	0.7	1.7	0.7	-0.3	0.7	1.8	1.4	1.6	1.7	1.4	2.2	1.1	1.2	0.8	-0.2	1.0	1.0	1.5	1.4	2.1	2.5	1.1
	b	Book equity	1.0	0.6	0.8	0.8	0.7	0.8	0.5	0.7	1.0	0.8	0.4	0.7	0.6	0.5	0.7	0.4	0.6	0.6	0.7	1.0	0.8	1.0	0.8	0.7	0.4	0.2	0.7
	ni^{abs}	Absolute net income	0.1	0.4	0.2	0.3	0.3	0.1	0.4	0.3	0.2	0.2	0.7	0.3	0.4	0.3	0.3	0.4	0.3	0.5	0.4	0.1	0.1	-0.1	0.1	0.2	0.5	0.7	0.3
	ni^-	Negative net income	-0.3	-0.2	-0.2	-0.2	-0.2	-0.5	0.0	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	0.0	-0.2	-0.4	-0.2	-0.3	-0.4	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	-0.4	-0.2
	R^2	*Goodness of fit*	*0.90*	*0.93*	*0.91*	*0.93*	*0.91*	*0.94*	*0.93*	*0.94*	*0.92*	*0.80*	*0.81*	*0.75*	*0.88*	*0.85*	*0.84*	*0.88*	*0.86*	*0.83*	*0.75*	*0.82*	*0.66*	*0.75*	*0.87*	*0.92*	*0.87*	*0.89*	
Manufacturing	α_0	Intercept	0.3	0.7	1.0	1.6	0.9	0.7	1.0	1.0	0.7	0.9	0.7	1.6	1.6	2.0	1.0	0.9	0.8	1.0	1.0	1.0	0.7	1.6	2.0	1.8	1.6	1.2	1.1
	b	Book equity	0.9	0.9	0.8	0.6	0.8	0.8	0.8	0.7	0.6	0.7	0.9	0.6	0.6	0.4	0.8	0.9	0.7	0.7	0.6	0.7	0.7	0.5	0.5	0.6	0.6	0.8	0.7
	ni^{abs}	Absolute net income	0.2	0.1	0.0	0.3	0.3	0.2	0.2	0.3	0.5	0.4	0.3	0.4	0.4	0.6	0.3	0.2	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.4	0.4	0.3	0.4
	ni^-	Negative net income	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.3	-0.2	-0.1	0.0	-0.1	-0.1	-0.3	0.1	-0.1	0.0	-0.2	-0.2	-0.4	-0.1	-0.2	0.0	-0.1	-0.1	-0.1
	R^2	*Goodness of fit*	*0.91*	*0.91*	*0.89*	*0.90*	*0.91*	*0.93*	*0.94*	*0.93*	*0.92*	*0.86*	*0.90*	*0.92*	*0.88*	*0.88*	*0.89*	*0.87*	*0.85*	*0.85*	*0.84*	*0.82*	*0.87*	*0.89*	*0.88*	*0.88*	*0.91*	*0.94*	
Electrical equipment	α_0	Intercept	1.6	1.9	2.2	0.9	-0.1	0.3	0.7	1.8	2.1	2.5	2.5	2.6	1.9	2.2	1.4	1.8	1.9	2.1	1.2	1.7	0.5	0.6	1.8	2.3	1.8	1.2	1.6
	b	Book equity	0.5	0.5	0.0	0.8	1.0	0.8	0.8	0.5	0.4	0.2	0.4	0.3	0.6	0.5	0.8	0.6	0.3	0.3	0.6	0.5	0.9	0.9	0.5	0.5	0.6	0.7	0.6
	ni^{abs}	Absolute net income	0.5	0.4	1.0	0.3	0.1	0.4	0.2	0.4	0.4	0.8	0.5	0.6	0.3	0.4	0.2	0.4	0.7	0.7	0.5	0.5	0.2	0.2	0.6	0.3	0.4	0.3	0.4
	ni^-	Negative net income	-0.5	-0.1	-0.1	-0.2	0.2	0.1	0.0	-0.3	-0.4	-0.7	-0.4	-0.5	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.1	-0.3	-0.2	0.1	-0.1	0.0	-0.2	-0.1	-0.2
	R^2	*Goodness of fit*	*0.67*	*0.76*	*0.85*	*0.80*	*0.89*	*0.89*	*0.87*	*0.81*	*0.72*	*0.89*	*0.80*	*0.84*	*0.74*	*0.81*	*0.84*	*0.87*	*0.83*	*0.66*	*0.77*	*0.73*	*0.86*	*0.84*	*0.81*	*0.80*	*0.91*	*0.92*	
Automobiles	α_0	Intercept	1.5	1.5	1.7	1.0	0.9	1.3	1.3	1.6	0.8	0.8	1.2	1.7	0.8	1.5	1.9	1.5	2.0	1.2	1.9	0.8	1.7	2.0	2.2	2.2	2.1	1.9	1.5
	b	Book equity	0.5	0.6	0.4	0.8	0.8	0.5	0.7	0.4	0.7	0.8	0.8	0.5	0.8	0.6	0.5	0.7	0.4	0.6	0.3	0.8	0.4	0.5	0.4	0.4	0.5	0.6	0.6
	ni^{abs}	Absolute net income	0.5	0.4	0.6	0.2	0.2	0.4	0.2	0.6	0.4	0.4	0.2	0.5	0.3	0.4	0.4	0.3	0.5	0.4	0.6	0.3	0.6	0.4	0.5	0.5	0.4	0.3	0.4
	ni^-	Negative net income	-0.6	-0.5	-0.3	0.3	-0.1	0.1	0.1	-0.3	-0.2	-0.2	-0.2	-0.6	-0.1	0.0	-0.2	-0.3	-0.4	0.0	-0.4	-0.2	-0.2	0.0	-0.1	-0.1	-0.2	-0.3	-0.2
	R^2	*Goodness of fit*	*0.94*	*0.95*	*0.97*	*0.95*	*0.94*	*0.96*	*0.93*	*0.94*	*0.91*	*0.89*	*0.82*	*0.94*	*0.91*	*0.92*	*0.86*	*0.92*	*0.88*	*0.88*	*0.80*	*0.85*	*0.87*	*0.85*	*0.91*	*0.88*	*0.88*	*0.92*	
Aircraft	α_0	Intercept	1.3	1.7	0.8	0.5	0.5	-0.8	0.3	0.7	-0.1	0.9	0.9	0.2	1.5	1.3	1.1	1.4	1.6	1.0	0.7	0.4	1.1	1.9	2.0	2.2	1.5	1.0	1.0
	b	Book equity	0.6	0.6	0.8	0.9	0.9	1.5	1.2	0.9	1.0	0.6	0.8	0.9	0.6	0.6	0.7	0.7	0.5	0.7	0.6	0.9	0.7	0.7	0.6	0.5	0.7	0.9	0.8
	ni^{abs}	Absolute net income	0.3	0.3	0.2	0.1	0.1	-0.6	-0.2	0.0	0.0	0.5	0.3	0.2	0.4	0.4	0.4	0.4	0.6	0.4	0.5	0.2	0.3	0.2	0.4	0.4	0.3	0.2	0.2
	ni^-	Negative net income	-0.1	-0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.4	0.2	0.0	0.0	-0.1	-0.4	0.0	0.1	-0.1	-0.4	0.1	-0.2	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1
	R^2	*Goodness of fit*	*0.95*	*0.96*	*0.97*	*0.98*	*0.98*	*0.90*	*0.89*	*0.95*	*0.96*	*0.96*	*0.93*	*0.95*	*0.90*	*0.91*	*0.93*	*0.93*	*0.93*	*0.85*	*0.94*	*0.90*	*0.92*	*0.89*	*0.94*	*0.94*	*0.95*	*0.96*	
Mining	α_0	Intercept	0.3	1.4	1.8	2.1	2.8	0.4	0.2	0.9	1.3	0.9	2.3	0.9	2.4	1.8	0.7	1.2	0.9	1.4	1.5	1.9	2.5	2.7	2.7	2.9	2.6	2.8	1.7
	b	Book equity	1.1	0.8	0.7	0.5	0.4	0.8	0.9	0.5	0.7	0.7	0.4	1.4	0.5	0.8	1.0	0.7	0.6	0.6	0.4	0.5	0.0	0.4	0.2	0.2	0.3	0.3	0.6
	ni^{abs}	Absolute net income	-0.2	0.1	0.0	0.4	0.5	0.5	0.3	0.7	0.3	0.4	0.6	-0.5	0.3	0.1	0.1	0.3	0.5	0.4	0.6	0.4	1.2	0.6	0.8	0.7	0.7	0.6	0.4
	ni^-	Negative net income	-0.2	-0.1	-0.9	0.0	-0.4	-1.3	0.1	0.1	0.1	-0.1	-0.3	-0.5	-0.2	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.3	-0.7	-0.2	-0.6	-0.3	-0.1	-0.2	-0.3
	R^2	*Goodness of fit*	*0.78*	*0.77*	*0.85*	*0.64*	*0.74*	*0.85*	*0.89*	*0.90*	*0.82*	*0.75*	*0.85*	*0.77*	*0.83*	*0.82*	*0.88*	*0.95*	*0.83*	*0.82*	*0.70*	*0.67*	*0.69*	*0.83*	*0.68*	*0.80*	*0.84*	*0.88*	
Fuels	α_0	Intercept	1.4	1.3	1.4	1.1	1.5	1.4	1.0	2.0	1.2	1.2	1.3	0.9	1.3	1.3	1.5	1.8	0.9	1.4	1.7	1.4	0.9	1.8	2.0	2.4	2.1	1.0	1.4
	b	Book equity	0.7	0.8	0.7	0.8	0.6	0.6	0.8	0.6	0.7	0.8	0.8	0.9	0.8	0.8	0.7	0.8	0.7	0.7	0.6	0.6	0.8	0.5	0.5	0.6	0.5	0.9	0.7
	ni^{abs}	Absolute net income	0.1	0.1	0.2	0.2	0.4	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.5	0.5	0.3	0.4	0.1	0.3
	ni^-	Negative net income	-0.2	-0.1	-0.2	-0.1	-0.2	-0.2	0.0	-0.1	0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.3	-0.3	-0.3	-0.1	0.0	-0.1	-0.1	-0.1	-0.1
	R^2	*Goodness of fit*	*0.95*	*0.94*	*0.94*	*0.92*	*0.92*	*0.90*	*0.91*	*0.89*	*0.94*	*0.90*	*0.89*	*0.93*	*0.88*	*0.89*	*0.92*	*0.86*	*0.87*	*0.86*	*0.85*	*0.84*	*0.83*	*0.82*	*0.84*	*0.79*	*0.81*	*0.95*	
Communication	α_0	Intercept	3.8	2.8	1.4	2.1	1.9	1.8	2.1	1.8	2.4	2.1	2.5	2.3	2.2	2.5	2.3	2.1	2.4	2.4	1.2	2.0	1.4	2.1	2.5	1.4	2.0	1.3	2.1
	b	Book equity	-0.3	0.1	0.7	0.5	0.7	0.5	0.6	0.8	0.3	0.4	0.6	0.6	0.6	0.5	0.6	0.7	0.5	0.6	0.7	0.6	0.7	0.5	0.5	0.7	0.6	0.8	0.5
	ni^{abs}	Absolute net income	1.1	0.8	0.2	0.4	0.2	0.4	0.4	0.1	0.6	0.6	0.3	0.3	0.3	0.5	0.3	0.3	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.2	0.4
	ni^-	Negative net income	0.0	0.0	0.0	0.1	-2.4	0.1	-0.1	0.0	-0.6	0.1	-0.4	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.2
	R^2	*Goodness of fit*	*0.93*	*0.94*	*0.93*	*0.93*	*0.94*	*0.92*	*0.89*	*0.85*	*0.91*	*0.90*	*0.91*	*0.89*	*0.90*	*0.91*	*0.84*	*0.87*	*0.82*	*0.81*	*0.75*	*0.80*	*0.77*	*0.83*	*0.78*	*0.86*	*0.86*	*0.94*	
Services	α_0	Intercept	2.4	2.1	1.7	2.1	1.9	1.3	1.5	1.7	1.5	1.5	1.9	1.5	1.7	1.8	1.7	1.9	2.0	2.4	1.6	1.4	1.3	2.1	2.3	2.2	2.0	1.8	1.8
	b	Book equity	0.4	0.6	0.7	0.5	0.6	0.7	0.6	0.5	0.5	0.6	0.5	0.7	0.7	0.7	0.8	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	ni^{abs}	Absolute net income	0.4	0.2	0.2	0.4	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.4	0.4	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
	ni^-	Negative net income	-0.5	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.6	-0.3	-0.4	-0.2	-0.2	-0.1	-0.1	-0.2	-0.3	0.0	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.1	-0.3
	R^2	*Goodness of fit*	*0.78*	*0.83*	*0.87*	*0.83*	*0.81*	*0.79*	*0.85*	*0.82*	*0.82*	*0.78*	*0.80*	*0.81*	*0.81*	*0.77*	*0.77*	*0.77*	*0.76*	*0.66*	*0.67*	*0.74*	*0.77*	*0.79*	*0.84*	*0.82*	*0.82*	*0.89*	
Business equipment	α_0	Intercept	2.0	1.6	2.0	1.4	1.6	0.9	0.9	1.3	0.7	1.3	1.7	1.8	1.5	2.1	1.5	1.7	1.3	1.9	1.2	1.1	0.8	1.5	1.8	1.7	1.6	1.5	1.5
	b	Book equity	0.6	0.8	0.4	0.8	0.7	0.8	0.8	0.6	0.7	0.6	0.6	0.6	0.7	0.5	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
	ni^{abs}	Absolute net income	0.4	0.2	0.5	0.2	0.3	0.3	0.2	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
	ni^-	Negative net income	-0.4	-0.1	-0.6	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.4	-0.3	-0.2	-0.2	-0.3	0.0	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
	R^2	*Goodness of fit*	*0.87*	*0.89*	*0.92*	*0.90*	*0.84*	*0.88*	*0.88*	*0.87*	*0.87*	*0.86*	*0.86*	*0.85*	*0.84*	*0.80*	*0.86*	*0.84*	*0.84*	*0.77*	*0.80*	*0.81*	*0.80*	*0.81*	*0.87*	*0.87*	*0.87*	*0.93*	
Business supplies	α_0	Intercept	0.8	1.3	1.0	1.8	2.0	2.4	1.8	2.8	2.0	0.7	1.3	0.9	1.0	0.9	1.4	1.3	1.7	1.8	1.2	0.7	-0.1	0.9	1.9	1.5	1.7	1.3	1.4
	b	Book equity	0.7	0.6	0.8	0.6	0.4	0.2	0.6	0.2	0.3	0.8	0.7	0.8	0.8	1.0	0.7	0.7	0.6	0.5	0.6	0.8	1.0	0.8	0.6	0.8	0.6	0.8	0.7
	ni^{abs}	Absolute net income	0.3	0.4	0.2	0.4	0.5	0.8	0.3	0.7	0.7	0.3	0.3	0.3	0.2	0.0	0.2	0.3	0.4	0.5	0.4	0.4	0.2	0.3	0.4	0.2	0.4	0.2	0.4
	ni^-	Negative net income	-0.3	0.5	-0.1	-0.8	-0.5	-1.2	-1.3	-1.5	-0.9	0.0	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.2	-0.3	-0.3	-0.1	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.3
	R^2	*Goodness of fit*	*0.90*	*0.91*	*0.93*	*0.94*	*0.97*	*0.98*	*0.96*	*0.95*	*0.95*	*0.93*	*0.93*	*0.93*	*0.93*	*0.93*	*0.90*	*0.88*	*0.88*	*0.89*	*0.89*	*0.93*	*0.95*	*0.95*	*0.92*	*0.93*	*0.90*	*0.94*	
Transportation	α_0	Intercept	0.3	1.6	1.0	0.4	1.6	1.3	1.1	0.9	0.2	0.5	1.3	2.3	0.8	1.3	1.2	0.9	0.7	1.6	1.1	0.7	1.2	1.7	1.9	1.5	2.1	1.7	1.2
	b	Book equity	0.7	0.3	0.6	0.9	0.4	0.6	0.7	0.8	1.0	0.9	0.7	0.3	0.9	0.7	0.7	0.9	0.8	0.5	0.6	0.8	0.7	0.6	0.6	0.7	0.6	0.6	0.7
	ni^{abs}	Absolute net income	0.4	0.8	0.3	0.1	0.6	0.4	0.3	0.1	0.1	0.2	0.3	0.7	0.1	0.4	0.3	0.2	0.2	0.5	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
	ni^-	Negative net income	0.1	-0.1	0.0	-0.2	-0.3	-0.3	-0.1	0.0	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.1	-0.2	0.0	-0.3	-0.3	-0.4	-0.3	-0.4	-0.1	-0.3	-0.1	-0.2
	R^2	*Goodness of fit*	*0.89*	*0.90*	*0.93*	*0.93*	*0.92*	*0.94*	*0.90*	*0.94*	*0.94*	*0.93*	*0.90*	*0.93*	*0.89*	*0.91*	*0.90*	*0.92*	*0.89*	*0.82*	*0.84*	*0.86*	*0.84*	*0.87*	*0.89*	*0.90*	*0.89*	*0.91*	
Wholesale	α_0	Intercept	0.8	1.3	0.9	1.3	1.3	0.8	1.2	1.4	0.1	1.8	1.3	1.3	1.7	1.5	1.2	1.4	1.3	1.6	1.2	1.2	1.0	1.4	1.5	2.0	1.7	2.0	1.3
	b	Book equity	0.8	0.6	0.6	0.6	0.7	0.7	0.6	0.5	0.8	0.4	0.6	0.7	0.5	0.6	0.7	0.7	0.7	0.5	0.4	0.6	0.6	0.6	0.7	0.4	0.6	0.5	0.6
	ni^{abs}	Absolute net income	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.4	0.7	0.5	0.4	0.5	0.4	0.3	0.3	0.3	0.5	0.6	0.4	0.6	0.5	0.3	0.6	0.4	0.5	0.4
	ni^-	Negative net income	-0.1	-0.3	-0.3	-0.2	-0.5	-0.3	-0.1	-0.5	-0.5	-0.4	-0.4	-0.4	-0.2	-0.1	-0.2	-0.3	-0.4	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.2	-0.3	-0.2	-0.3
	R^2	*Goodness of fit*	*0.84*	*0.87*	*0.91*	*0.93*	*0.91*	*0.90*	*0.89*	*0.87*	*0.85*	*0.80*	*0.81*	*0.83*	*0.86*	*0.84*	*0.84*	*0.83*	*0.80*	*0.80*	*0.78*	*0.74*	*0.79*	*0.80*	*0.78*	*0.85*	*0.87*	*0.87*	
Retail	α_0	Intercept	2.2	3.0	1.7	1.8	1.8	0.9	2.0	1.6	0.2	0.8	1.1	1.3	1.4	1.0	1.1	1.3	1.2	1.3	0.2	0.5	1.2	1.6	1.8	1.9	1.3	1.2	1.4
	b	Book equity	0.1	0.0	0.5	0.5	0.5	0.8	0.4	0.5	0.9	0.8	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.5	0.7	0.8	0.5	0.5	0.6	0.6	0.8	0.8	0.6
	ni^{abs}	Absolute net income	0.9	0.9	0.4	0.5	0.5	0.3	0.6	0.5	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.4	0.3	0.3	0.5
	ni^-	Negative net income	-0.3	-0.9	-1.0	-0.3	-0.3	-0.3	-0.4	-0.3	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.3	-0.4	-0.3	-0.3	-0.5	-0.5	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	-0.4
	R^2	*Goodness of fit*	*0.89*	*0.89*	*0.90*	*0.91*	*0.91*	*0.89*	*0.93*	*0.94*	*0.93*	*0.90*	*0.87*	*0.87*	*0.88*	*0.86*	*0.86*	*0.85*	*0.80*	*0.80*	*0.83*	*0.84*	*0.88*	*0.82*	*0.89*	*0.89*	*0.92*	*0.93*	
Restauraunts & Hotels	α_0	Intercept	3.9	2.1	2.2	3.0	0.4	0.2	1.3	1.0	0.9	1.7	2.3	2.5	1.4	2.1	1.9	1.3	0.7	1.8	0.8	1.2	0.9	1.2	2.0	2.2	1.4	1.8	1.6
	b	Book equity	-0.5	0.5	0.3	0.0	1.0	1.0	0.7	0.8	0.6	0.6	0.6	0.3	0.6	0.5	0.5	0.6	0.8	0.4	0.7	0.5	0.7	0.8	0.5	0.4	0.8	0.7	0.6
	ni^{abs}	Absolute net income	1.4	0.4	0.6	0.9	0.1	0.2	0.4	0.3	0.5	0.5	0.4	0.7	0.4	0.5	0.5	0.5	0.4	0.6	0.4	0.6	0.4	0.3	0.5	0.6	0.3	0.3	0.5
	ni^-	Negative net income	-1.4	-0.9	-0.4	-0.7	-0.3	-0.5	-0.4	-0.3	-0.5	-0.7	-0.6	-0.3	-0.4	-0.3	-0.3	-0.2	-0.3	-0.4	-0.5	-0.7	-0.3	-0.4	-0.3	-0.2	-0.1	-0.1	-0.4
	R^2	*Goodness of fit*	*0.95*	*0.92*	*0.93*	*0.92*	*0.91*	*0.91*	*0.95*	*0.91*	*0.93*	*0.87*	*0.83*	*0.84*	*0.88*	*0.81*	*0.83*	*0.90*	*0.86*	*0.84*	*0.88*	*0.90*	*0.86*	*0.76*	*0.88*	*0.89*	*0.92*	*0.91*	
Other	α_0	Intercept	1.7	3.0	0.6	1.6	4.2	2.9	2.5	1.1	1.2	2.6	1.5	1.5	1.3	1.7	1.5	1.6	1.6	1.9	0.5	0.7	1.4	1.6	2.6	2.7	1.8	2.1	1.8
	b	Book equity	0.1	-0.3	0.7	0.5	-0.6	-0.3	0.1	0.7	0.7	0.3	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.3	0.6	0.8	0.6	0.7	0.3	0.4	0.4	0.4	0.4
	ni^{abs}	Absolute net income	1.0	1.3	0.5	0.4	1.5	1.3	0.9	0.4	0.4	0.6	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.7	0.6	0.4	0.4	0.2	0.6	0.5	0.8	0.7	0.6
	ni^-	Negative net income	-0.7	0.0	1.0	2.4	-2.1	-1.9	-0.7	0.2	-0.4	-0.2	-0.1	0.0	-0.1	-0.3	-0.4	-0.2	-0.2	-0.4	-0.5	-0.6	-0.2	-0.2	-0.4	-0.5	-0.3	-0.5	-0.3
	R^2	*Goodness of fit*	*0.93*	*0.91*	*0.96*	*0.91*	*0.94*	*0.94*	*0.94*	*0.81*	*0.79*	*0.77*	*0.87*	*0.88*	*0.87*	*0.73*	*0.82*	*0.83*	*0.78*	*0.79*	*0.70*	*0.71*	*0.77*	*0.72*	*0.71*	*0.75*	*0.87*	*0.85*	

Appendix A3: Accounting multiples from fundamental value regression (Model 3)

The table reports the multiples from fundamental value regression. Data is collected from Thomson Financial SDC Platinum and Thomson Financial Worldscope databases, and the period under review is from 1982 to 2006. The dependent variable is the natural logarithm of market value. The independent variables are the natural logarithm of book value of equity, the natural logarithm of the absolute value of net income, a dummy variable indicating when the net income is negative, and book leverage. The regression is estimated cross-sectionally at the industry-year level for each of the industries. Specifically, the results are based on Equation 22, that is,

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} ni_{it}^{abs} + \alpha_{3jt} ni_{it}^{-} + \alpha_{4jt} LEV_{it} + \varepsilon_{it} .$$

Industry	Coefficients	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Food	α_0 Intercept	2.4	2.0	2.4	2.9	2.1	2.3	2.0	1.4	0.8	1.2	1.4	1.4	1.6	2.7	1.9	1.9	2.0	2.3	2.2	2.3	1.5	2.5	2.8	2.9	2.8	2.9	2.1
	b Book equity	0.3	0.6	0.4	0.2	0.7	0.4	0.4	0.6	0.8	0.7	0.7	0.7	0.8	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.7	0.5	0.4	0.4	0.4	0.3	0.5
	ni^{abs} Absolute net income	0.6	0.4	0.6	0.7	0.2	0.7	0.6	0.5	0.3	0.5	0.5	0.4	0.3	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.4	0.5	0.5	0.6	0.5	0.7	0.5
	ni^{-} Negative net income	-0.9	-0.6	-0.5	-0.1	-0.1	0.0	-0.3	-0.1	0.1	-0.1	-0.1	-0.2	-0.1	-0.3	-0.1	-0.2	-0.2	-0.3	-0.4	-0.3	-0.3	-0.2	-0.3	-0.3	-0.1	0.0	-0.2
	LEV Leverage	-1.0	-1.7	-1.2	-1.2	-1.3	-1.5	-0.6	-0.8	-1.1	-0.7	-0.6	-0.4	-0.9	-1.2	-0.5	-0.8	-1.7	-1.9	-1.8	-2.0	-1.4	-1.7	-1.5	-1.4	-1.2	-1.2	-1.2
	R^2 Goodness of fit	0.93	0.95	0.96	0.96	0.92	0.96	0.96	0.95	0.95	0.95	0.95	0.94	0.93	0.93	0.94	0.90	0.91	0.89	0.93	0.90	0.93	0.93	0.91	0.92	0.94	0.97	
Recreation	α_0 Intercept	1.6	0.9	1.2	1.2	1.5	1.5	1.9	1.8	2.6	1.4	1.9	2.3	1.9	1.9	1.7	1.9	2.0	2.6	2.1	2.4	1.7	2.6	2.5	2.0	2.4	2.6	1.9
	b Book equity	0.6	1.1	0.8	0.7	0.7	0.8	0.7	0.7	0.3	0.8	0.9	0.7	0.8	0.8	0.8	0.8	0.7	0.5	0.6	0.5	0.7	0.5	0.6	0.7	0.6	0.7	0.7
	ni^{abs} Absolute net income	0.4	-0.1	0.2	0.4	0.4	0.3	0.2	0.3	0.7	0.3	0.1	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.4	0.6	0.4	0.5	0.4	0.3	0.3	0.2	0.3
	ni^{-} Negative net income	-0.1	0.3	0.5	-0.4	-0.2	-0.2	-0.4	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.1	0.0	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.2	-0.1	0.1	-0.1
	LEV Leverage	-0.9	-1.6	-1.6	-0.8	-1.0	-1.5	-1.0	-1.3	-1.8	-2.4	-2.8	-2.3	-1.9	-2.0	-1.7	-2.1	-2.3	-2.2	-2.7	-2.9	-1.7	-2.4	-2.2	-1.3	-1.5	-1.9	-1.8
	R^2 Goodness of fit	0.98	0.96	0.97	0.94	0.90	0.92	0.92	0.90	0.90	0.91	0.92	0.89	0.87	0.89	0.89	0.82	0.83	0.78	0.82	0.85	0.87	0.89	0.86	0.91	0.86	0.88	
Publishing	α_0 Intercept	2.7	3.9	3.1	2.8	2.5	2.4	1.5	1.4	1.0	0.9	1.0	1.1	2.3	1.7	2.1	1.6	2.0	2.6	2.0	1.6	2.7	3.2	2.6	1.9	1.7	1.9	2.1
	b Book equity	-0.1	-0.1	0.1	0.0	0.5	0.4	0.8	0.9	0.9	0.6	0.9	0.8	0.3	0.7	0.5	0.8	0.7	0.6	0.6	0.7	0.5	0.3	0.5	0.8	0.8	0.7	0.5
	ni^{abs} Absolute net income	1.2	1.0	0.9	1.1	0.6	0.7	0.2	0.2	0.2	0.6	0.2	0.2	0.7	0.4	0.5	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.5	0.2	0.3	0.3	0.5
	ni^{-} Negative net income	0.0	-4.1	0.0	0.0	0.2	0.0	0.3	0.0	0.3	-0.1	0.1	-0.1	-0.3	0.1	0.2	0.0	-0.2	-0.3	0.2	-0.1	-0.1	0.2	0.1	0.0	0.1	0.0	-0.1
	LEV Leverage	-0.7	-2.0	-2.0	-0.9	-2.5	-1.6	-0.6	-1.6	-1.5	0.0	-1.2	0.0	-0.5	-1.6	-0.4	-1.4	-2.4	-3.6	-2.5	-2.2	-2.7	-2.9	-1.4	-2.2	-2.4	-2.5	-1.7
	R^2 Goodness of fit	0.98	0.92	0.97	0.97	0.96	0.96	0.96	0.95	0.95	0.98	0.93	0.93	0.96	0.94	0.95	0.94	0.93	0.92	0.96	0.95	0.92	0.94	0.95	0.94	0.94	0.95	
Consumer goods	α_0 Intercept	0.9	0.7	0.7	1.1	0.9	1.4	1.9	0.5	1.2	1.2	1.5	1.4	2.1	1.9	2.4	0.6	1.6	2.0	1.7	1.8	2.3	1.6	2.1	2.1	2.4	2.4	1.6
	b Book equity	0.8	1.0	0.8	0.7	0.8	0.8	0.7	1.1	0.9	0.9	0.9	0.7	0.5	0.6	0.6	0.9	0.7	0.6	0.6	0.5	0.6	0.7	0.5	0.5	0.6	0.4	0.7
	ni^{abs} Absolute net income	0.2	0.0	0.2	0.3	0.3	0.3	0.3	0.0	0.2	0.2	0.1	0.4	0.6	0.4	0.4	0.3	0.4	0.5	0.6	0.7	0.5	0.4	0.6	0.6	0.5	0.6	0.4
	ni^{-} Negative net income	-0.3	0.0	0.0	0.0	-0.2	-0.1	-0.2	-0.1	0.0	-0.1	-0.3	-0.3	-0.5	-0.1	-0.1	-0.1	-0.2	0.0	-0.4	-0.3	-0.3	-0.1	-0.2	-0.2	-0.3	-0.4	-0.2
	LEV Leverage	-1.0	-1.1	-0.6	-0.6	-0.4	-1.7	-1.8	-1.1	-1.7	-1.9	-1.7	-1.1	-1.1	-1.6	-1.8	-0.7	-1.9	-2.2	-1.7	-1.6	-2.4	-1.8	-1.4	-2.1	-2.5	-1.2	-1.5
	R^2 Goodness of fit	0.95	0.96	0.97	0.96	0.98	0.91	0.90	0.93	0.93	0.93	0.93	0.94	0.93	0.90	0.85	0.92	0.92	0.91	0.88	0.90	0.85	0.88	0.93	0.94	0.89	0.94	
Apparel	α_0 Intercept	1.9	2.5	1.2	1.5	2.4	2.0	1.4	1.8	0.9	1.3	1.5	2.7	1.6	1.3	1.5	2.3	2.3	1.9	1.6	1.2	1.4	1.6	1.2	2.5	3.7	2.0	1.8
	b Book equity	0.3	0.4	1.0	0.9	0.5	0.3	0.7	0.5	0.8	0.8	0.7	0.3	0.7	1.0	0.9	0.5	0.6	0.5	0.8	0.8	0.8	0.9	0.9	0.5	0.2	0.6	0.7
	ni^{abs} Absolute net income	0.7	0.5	0.0	0.2	0.5	0.8	0.3	0.6	0.4	0.4	0.4	0.7	0.4	0.1	0.2	0.5	0.4	0.6	0.3	0.3	0.4	0.2	0.2	0.5	0.6	0.4	0.4
	ni^{-} Negative net income	0.0	0.0	0.0	-0.2	-0.3	3.5	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	0.1	0.3	0.0	-0.1	-0.2	-0.3	-0.3	-0.1	0.3	0.4	0.3	-0.3	-0.2	0.1	0.1
	LEV Leverage	-0.9	-1.7	-2.3	-2.2	-2.4	-1.1	-0.8	-0.9	-1.2	-1.7	-1.5	-1.6	-1.8	-3.0	-2.8	-2.6	-2.6	-2.2	-2.9	-2.4	-3.4	-4.6	-3.2	-1.7	-2.0	-1.5	-2.1
	R^2 Goodness of fit	0.93	0.93	0.95	0.94	0.93	0.97	0.92	0.96	0.96	0.96	0.96	0.95	0.95	0.95	0.91	0.94	0.91	0.93	0.92	0.90	0.82	0.85	0.86	0.90	0.87	0.92	
Healthcare	α_0 Intercept	2.6	2.2	2.2	2.1	1.9	2.4	2.4	2.6	2.3	3.3	3.0	2.5	2.0	2.6	2.4	2.2	2.2	2.7	2.6	2.6	2.3	2.9	2.5	2.8	2.4	2.0	2.5
	b Book equity	0.7	0.8	0.6	0.8	0.8	0.5	0.5	0.5	0.7	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.7	0.6
	ni^{abs} Absolute net income	0.2	0.0	0.3	0.2	0.2	0.4	0.5	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.3	0.4
	ni^{-} Negative net income	0.1	-0.6	-0.5	-0.1	-0.2	-0.3	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	-0.2
	LEV Leverage	-2.9	-2.1	-1.6	-1.4	-1.5	-1.3	-1.3	-1.7	-2.1	-2.6	-2.2	-1.9	-1.2	-2.1	-2.0	-1.8	-2.6	-3.3	-3.4	-3.1	-2.6	-3.5	-2.0	-2.4	-2.4	-1.6	-2.2
	R^2 Goodness of fit	0.98	0.97	0.96	0.96	0.97	0.95	0.95	0.93	0.92	0.90	0.91	0.89	0.90	0.88	0.87	0.85	0.84	0.83	0.85	0.88	0.87	0.83	0.89	0.85	0.87	0.91	
Chemicals	α_0 Intercept	1.6	1.4	1.5	1.1	0.9	1.8	2.6	2.2	2.2	2.2	2.9	2.1	1.9	1.8	1.8	1.5	1.9	2.3	2.5	2.0	2.0	2.3	2.4	2.5	2.0	2.0	2.0
	b Book equity	0.7	0.8	0.6	0.9	1.0	0.7	0.3	0.5	0.5	0.7	0.3	0.6	0.5	0.8	0.7	0.8	0.7	0.6	0.6	0.8	0.8	0.6	0.7	0.6	0.7	0.6	0.7
	ni^{abs} Absolute net income	0.3	0.2	0.4	0.2	0.0	0.3	0.6	0.5	0.5	0.3	0.6	0.4	0.6	0.3	0.4	0.3	0.4	0.5	0.4	0.3	0.3	0.6	0.3	0.3	0.3	0.4	0.4
	ni^{-} Negative net income	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.4	-0.1	-0.3	-0.2	0.0	-0.1	-0.2	0.1	0.0	0.1	0.0	-0.1	-0.4	-0.2	-0.3	-0.1	0.0	-0.1	-0.1	-0.1	-0.1
	LEV Leverage	-1.8	-1.6	-1.3	-1.5	-0.9	-1.5	-1.3	-1.2	-1.1	-1.8	-0.8	-0.9	-1.0	-2.0	-1.4	-1.6	-1.5	-2.6	-2.8	-2.2	-2.3	-2.0	-1.5	-1.4	-0.8	-0.5	-1.5
	R^2 Goodness of fit	0.98	0.98	0.98	0.97	0.98	0.95	0.96	0.94	0.94	0.95	0.93	0.93	0.93	0.95	0.94	0.94	0.92	0.93	0.93	0.90	0.84	0.93	0.92	0.91	0.92	0.94	
Building	α_0 Intercept	1.8	1.6	1.3	1.3	1.3	1.6	1.3	1.6	1.5	0.8	1.1	1.3	1.5	1.5	1.5	1.8	1.8	2.0	1.9	2.1	1.8	2.3	2.5	2.2	2.0	0.9	1.6
	b Book equity	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.7	0.7	1.0	0.9	0.8	0.7	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.7	0.7	1.0	0.7
	ni^{abs} Absolute net income	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.3	0.2	0.0	0.3
	ni^{-} Negative net income	-0.1	0.0	0.0	-0.1	0.1	0.0	0.0	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.2	-0.1	0.0	0.1	-0.1	-0.1	-0.1	-0.1
	LEV Leverage	-1.8	-0.8	-1.2	-1.1	-1.1	-2.1	-1.8	-1.3	-1.9	-1.4	-1.7	-1.8	-1.5	-1.6	-1.6	-1.3	-1.6	-1.8	-2.3	-2.2	-2.4	-2.7	-1.4	-2.2	-1.6	-1.2	-1.7
	R^2 Goodness of fit	0.91	0.91	0.93	0.94	0.89	0.90	0.89	0.87	0.93	0.94	0.93	0.93	0.94	0.93	0.94	0.90	0.90	0.89	0.89	0.90	0.89	0.91	0.90	0.94	0.92	0.95	
Steel works	α_0 Intercept	1.0	2.0	0.9	0.8	1.4	1.1	2.0	1.7	0.7	1.9	2.7	2.1	2.1	2.4	1.8	2.5	2.0	2.2	2.4	1.4	2.2	2.1	1.8	1.4	2.4	2.9	1.8
	b Book equity	1.0	0.6	1.0	0.9	0.7	0.9	0.5	0.6	1.0	0.8	0.5	0.8	0.6	0.6	0.8	0.6	0.7	0.8	0.8	1.0	0.8	0.9	0.8	0.7	0.4	0.2	0.7
	ni^{abs} Absolute net income	0.0	0.3	0.1	0.2	0.3	0.1	0.4	0.4	0.1	0.2	0.6	0.2	0.4	0.3	0.2	0.3	0.3	0.3	0.2	0.0	0.1	0.0	0.1	0.2	0.5	0.7	0.3
	ni^{-} Negative net income	-0.1	-0.1	0.0	-0.1	-0.1	-0.4	0.1	-0.2	-0.1	0.0	0.0	0.1	-0.1	0.1	0.0	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.2	-0.2	-0.2	-0.3	-0.1
	LEV Leverage	-1.7	-1.3	-1.5	-1.3	-1.0	-1.1	-0.6	-1.4	-1.8	-1.9	-2.0	-2.2	-0.9	-1.5	-1.8	-1.6	-2.0	-2.4	-3.1	-2.7	-2.7	-2.4	-0.9	-0.1	-0.6	-0.7	-1.6
	R^2 Goodness of fit	0.93	0.96	0.94	0.96	0.93	0.95	0.93	0.97	0.96	0.85	0.86	0.80	0.90	0.89	0.89	0.92	0.91	0.91	0.87	0.91	0.78	0.83	0.89	0.92	0.88	0.89	
Manufacturing	α_0 Intercept	1.0	1.2	1.3	1.7	1.1	1.1	1.4	1.2	1.2	1.4	1.3	1.7	2.0	2.3	1.5	1.5	1.8	2.0	2.2	2.4	1.9	2.2	2.7	2.4	2.2	1.5	1.7
	b Book equity	0.9	0.9	0.9	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.7	0.5	0.8	0.9	0.8	0.7	0.6	0.7	0.7	0.5	0.5	0.6	0.6	0.8	0.7
	ni^{abs} Absolute net income	0.1	0.1	0.0	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.5	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.3	0.2	0.3
	ni^{-} Negative net income	-0.1	0.0	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.0	0.0	-0.1	0.1	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-0.1	0.0	-0.1	-0.1	-0.1
	LEV Leverage	-1.6	-1.6	-1.0	-0.2	-0.5	-1.0	-1.1	-1.1	-1.5	-1.4	-1.5	-1.5	-1.6	-1.7	-1.7	-1.8	-2.4	-2.4	-2.6	-2.9	-2.2	-1.4	-2.3	-1.9	-1.6	-1.1	-1.6
	R^2 Goodness of fit	0.95	0.94	0.91	0.90	0.91	0.94	0.95	0.94	0.96	0.89	0.93	0.95	0.91	0.91	0.92	0.90	0.90	0.92	0.91	0.90	0.91	0.90	0.92	0.92	0.92	0.95	
Electrical equipment	α_0 Intercept	2.2	3.0	3.1	2.0	0.6	1.6	1.9	2.9	3.7	3.0	2.9	2.4	2.6	2.4	1.5	1.9	2.1	2.4	2.2	2.4	1.1	1.5	2.4	2.6	2.0	1.4	2.2
	b Book equity	0.9	0.4	0.0	0.9	1.1	0.7	0.7	0.5	0.4	0.4	0.6	0.7	0.6	0.7	0.9	0.7	0.4	0.5	0.5	0.5	0.9	0.8	0.6	0.6	0.6	0.8	0.6
	ni^{abs} Absolute net income	0.0	0.5	0.9	0.0	0.0	0.4	0.3	0.3	0.3	0.5	0.2	0.2	0.3	0.2	0.1	0.3	0.6	0.5	0.5	0.6	0.2	0.3	0.5	0.3	0.5	0.3	0.3
	ni^{-} Negative net income	0.2	0.0	-0.1	0.0	0.4	0.1	0.0	-0.2	-0.5	-0.5	-0.1	0.1	-0.2	-0.1	0.0	-0.1	-0.2	0.1	-0.1	-0.3	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1
	LEV Leverage	-3.8	-2.4	-1.7	-2.9	-1.9	-1.6	-1.8	-2.0	-2.8	-1.7	-2.4	-2.1	-2.2	-2.0	-1.7	-1.3	-1.4	-2.8	-2.5	-2.3	-1.5	-2.2	-2.6	-2.4	-1.1	-1.5	-2.1
	R^2 Goodness of fit	0.94	0.89	0.92	0.95	0.96	0.94	0.91	0.87	0.89	0.93	0.90	0.91	0.84	0.87	0.89	0.89	0.85	0.77	0.87	0.82	0.90	0.89	0.89	0.87	0.92	0.95	
Automobiles	α_0 Intercept	1.8	1.6	1.9	1.2	1.3	1.7	1.2	1.8	1.0	0.9	1.0	1.5	1.6	1.7	2.3	1.9	2.4	1.8	2.8	1.6	2.1	2.4	2.4	2.5	2.5	2.0	1.8
	b Book equity	0.7	0.7	0.5	0.8	0.8	0.6	0.9	0.6	1.0	1.0	1.1	0.8	0.8	0.8	0.7	0.7	0.5	0.6	0.4	0.8	0.5	0.6	0.5	0.4	0.6	0.6	0.7
	ni^{abs} Absolute net income	0.3	0.3	0.4	0.2	0.2	0.4	0.1	0.4	0.1	0.2	0.0	0.4	0.3	0.2	0.2	0.3	0.5	0.4	0.6	0.2	0.5	0.4	0.5	0.5	0.3	0.3	0.3
	ni^{-} Negative net income	-0.2	-0.2	-0.1	0.4	-0.1	0.1	0.0	-0.2	-0.1	0.0	0.1	-0.1	0.0	0.1	-0.1	-0.3	-0.4	0.0	-0.2	0.0	-0.2	0.0	-0.1	-0.1	-0.2	-0.3	-0.1
	LEV Leverage	-2.0	-1.5	-1.2	-0.9	-0.6	-0.8	-1.2	-1.4	-2.2	-1.9	-1.7	-1.6	-1.8	-1.7	-2.0	-1.2	-1.5	-1.6	-2.1	-2.0	-1.3	-1.5	-0.8	-0.8	-1.1	-0.3	-1.4
	R^2 Goodness of fit	0.99	0.97	0.98	0.96	0.95	0.96	0.95	0.96	0.96	0.93	0.86	0.96	0.96	0.95	0.92	0.94	0.90	0.92	0.89	0.89	0.89	0.87	0.92	0.89	0.90	0.92	
Aircraft	α_0 Intercept	1.2	1.6	1.2	0.6	0.9	0.0	2.0	0.9	0.0	1.5	1.8	1.2	2.5	2.3	1.6	1.8	1.9	1.7	1.3	1.2	1.6	2.0	1.9	2.8	2.0	1.5	1.5
	b Book equity	0.6	0.6	0.8	1.0	0.9	1.5	0.9	1.0	1.1	0.6	0.8	0.9	0.7	0.6	0.7	0.8	0.6	0.8	0.7	1.0	0.7	0.7	0.7	0.5	0.7	0.9	0.8
	ni^{abs} Absolute net income	0.3	0.3	0.2	0.1	0.1	-0.5	0.1	0.0	-0.1	0.5	0.3	0.2	0.3	0.4	0.4	0.3	0.5	0.3	0.4	0.2	0.4	0.2	0.4	0.5	0.3	0.2	0.2
	ni^{-} Negative net income	-0.1	-0.1	0.0	0.1	-0.1	0.1	-0.1	-0.2	0.4	0.1	0.1	-0.1	-0.2	0.1	0.1	-0.1	-0.3	0.2	0.0	0.0	-0.1	-0.2	0.1	-0.2	-0.1	0.0	0.0
	LEV Leverage	0.5	0.3	-1.0	-0.7	-0.8	-1.9	-2.6	-0.6	-0.7	-1.2	-1.7	-1.7	-2.7	-2.1	-1.4	-1.7	-1.7	-2.2	-1.5	-2.4	-1.7	-0.4	-1.9	-1.8	-2.0	-1.8	-1.4
	R^2 Goodness of fit	0.95	0.97	0.97	0.98	0.99	0.93	0.93	0.96	0.97	0.98	0.95	0.97	0.95	0.94	0.95	0.95	0.94	0.89	0.96	0.94	0.94	0.89	0.95	0.96	0.96	0.97	
Mining	α_0 Intercept	1.2	2.3	2.9	2.5	2.7	2.0	2.7	2.1	1.7	1.7	2.7	2.9	2.6	2.7	1.2	1.5	1.5	1.8	2.3	2.8	3.0	3.1	3.2	3.2	2.9	3.1	2.4
	b Book equity	1.1	0.8	0.5	0.7	0.6	0.8	0.6	0.6	0.8	0.8	0.6	1.0	0.7	0.8	1.0	0.7	0.6	0.6	0.6	0.6	0.1	0.5	0.4	0.3	0.4	0.4	0.6
	ni^{abs} Absolute net income	-0.2	0.0	0.3	0.3	0.3	0.1	0.2	0.4	0.3	0.4	0.4	-0.1	0.3	0.1	0.1	0.3	0.5	0.4	0.5	0.4	1.0	0.4	0.7	0.7	0.6	0.5	0.3
	ni^{-} Negative net income	0.1	0.0	-0.8	-0.1	-0.1	-0.6	-0.4	-0.1	0.0	-0.2	-0.2	-0.1	-0.2	0.0	0.0	-0.1	-0.2	0.0	-0.1	-0.1	-0.5	-0.1	-0.5	-0.2	-0.2	-0.2	-0.2
	LEV Leverage	-2.8	-2.2	-2.7	-3.6	-3.0	-3.2	-3.0	-3.2	-2.1	-2.6	-2.5	-4.3	-2.3	-3.7	-1.7	-0.9	-1.8	-1.3	-2.8	-3.3	-2.0	-3.1	-4.3	-3.1	-2.4	-2.8	-2.7
	R^2 Goodness of fit	0.96	0.88	0.99	0.90	0.91	0.97	0.98	0.96	0.86	0.88	0.91	0.91	0.87	0.88	0.90	0.95	0.86	0.84	0.79	0.77	0.72	0.90	0.78	0.85	0.88	0.92	
Fuels	α_0 Intercept	1.6	1.3	1.5	1.5	1.7	1.4	1.1	2.1	1.4	1.6	1.8	1.1	1.6	1.6	1.7	2.0	1.5	2.0	2.2	1.8	1.8	2.5	2.5	2.9	2.4	1.1	1.8
	b Book equity	0.7	0.9	0.7	0.8	0.6	0.6	0.8	0.6	0.7	0.8	0.7	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.8	0.5	0.6	0.6	0.6	1.0	0.7
	ni^{abs} Absolute net income	0.2	0.0	0.2	0.2	0.4	0.3	0.2	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.5	0.4	0.3	0.5	0.4	0.3	0.4	0.0	0.3
	ni^{-} Negative net income	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	0.0	-0.1	0.1	-0.1	-0.2	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1	-0.2	-0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.1
	LEV Leverage	-0.9	-0.8	-0.9	-1.3	-0.7	0.1	-0.3	-0.4	-0.5	-1.3	-1.1	-0.7	-1.1	-0.8	-1.2	-1.5	-1.7	-1.7	-1.7	-1.6	-2.5	-2.5	-2.7	-2.7	-2.3	-0.2	-1.3
	R^2 Goodness of fit	0.96	0.95	0.95	0.94	0.93	0.90	0.91	0.89	0.94	0.92	0.90	0.94	0.89	0.90	0.93	0.87	0.90	0.89	0.87	0.86	0.87	0.86	0.88	0.82	0.84	0.95	
Communication	α_0 Intercept	3.9	3.1	1.7	2.5	2.1	1.9	2.6	3.0	3.2	3.0	2.8	3.0	2.6	2.9	2.6	2.6	2.9	3.0	2.0	2.7	2.2	2.4	2.9	2.0	2.3	1.8	2.6
	b Book equity	0.1	0.4	0.7	0.5	0.7	0.5	0.6	0.8	0.5	0.5	0.7	0.5	0.6	0.6	0.6	0.7	0.5	0.6	0.7	0.6	0.6	0.5	0.5	0.7	0.6	0.8	0.6
	ni^{abs} Absolute net income	0.7	0.4	0.2	0.4	0.2	0.4	0.4	0.1	0.4	0.5	0.2	0.4	0.4	0.4	0.3	0.3	0.5	0.4	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.2	0.4
	ni^{-} Negative net income	0.0	0.1	0.0	0.1	-2.3	0.1	-0.1	0.1	-0.3	0.2	-0.2	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1
	LEV Leverage	-2.4	-2.1	-0.8	-0.9	-0.4	-0.4	-1.9	-2.7	-2.3	-2.7	-2.1	-2.3	-1.6	-2.0	-1.7	-1.5	-1.7	-2.5	-2.4	-2.3	-2.0	-1.3	-1.8	-1.9	-1.0	-1.2	-1.8
	R^2 Goodness of fit	0.98	0.98	0.93	0.94	0.94	0.92	0.91	0.90	0.93	0.95	0.95	0.92	0.92	0.93	0.87	0.89	0.84	0.85	0.80	0.83	0.81	0.84	0.81	0.88	0.86	0.95	
Services	α_0 Intercept	3.0	2.5	2.0	2.4	2.3	1.8	1.8	2.0	1.9	2.3	2.4	2.2	2.1	2.3	2.4	2.5	2.7	3.2	2.6	2.4	2.3	2.7	2.7	2.7	2.6	2.2	2.4
	b Book equity	0.5	0.7	0.7	0.6	0.7	0.8	0.7	0.6	0.7	0.7	0.5	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	ni^{abs} Absolute net income	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	ni^{-} Negative net income	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-0.1	-0.3	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.3	-0.3	-0.3	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2
	LEV Leverage	-2.4	-1.9	-1.1	-1.1	-1.6	-2.0	-1.2	-1.5	-1.7	-2.3	-1.6	-1.8	-1.6	-2.3	-2.3	-2.0	-2.8	-3.7	-3.3	-2.9	-2.7	-2.7	-2.0	-2.3	-2.4	-1.6	-2.1
	R^2 Goodness of fit	0.90	0.91	0.89	0.86	0.87	0.88	0.88	0.87	0.87	0.88	0.85	0.87	0.86	0.84	0.84	0.82	0.84	0.81	0.81	0.84	0.85	0.85	0.87	0.86	0.86	0.90	
Business equipment	α_0 Intercept	2.2	1.9	2.0	1.7	1.8	1.4	1.2	1.6	1.3	1.8	2.0	2.1	1.9	2.6	2.0	2.1	2.0	2.8	2.2	2.1	2.0	2.4	2.2	2.2	2.2	1.8	2.0
	b Book equity	0.8	0.8	0.6	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7
	ni^{abs} Absolute net income	0.2	0.2	0.4	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.3	0.3
	ni^{-} Negative net income	0.0	0.0	-0.3	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
	LEV Leverage	-2.4	-2.4	-1.5	-1.3	-1.2	-1.4	-1.1	-1.3	-1.6	-1.9	-1.8	-2.0	-2.1	-2.4	-2.1	-2.0	-2.4	-3.7	-2.9	-2.7	-2.7	-3.0	-1.9	-2.2	-2.3	-1.5	-2.1
	R^2 Goodness of fit	0.92	0.94	0.94	0.92	0.85	0.91	0.90	0.89	0.90	0.91	0.90	0.89	0.89	0.86	0.89	0.88	0.89	0.87	0.88	0.88	0.86	0.87	0.89	0.90	0.90	0.94	
Business supplies	α_0 Intercept	1.0	1.1	1.1	1.5	1.8	2.2	1.9	2.3	1.6	1.0	1.6	1.2	1.1	1.1	1.6	1.8	2.2	2.6	1.8	1.5	0.8	1.5	2.3	2.0	2.1	1.7	1.6
	b Book equity	1.0	1.0	0.9	0.9	0.6	0.4	0.8	0.5	0.6	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.7	0.5	0.7	0.8	1.0	0.8	0.7	0.8	0.7	0.9	0.8
	ni^{abs} Absolute net income	0.0	0.0	0.1	0.1	0.4	0.6	0.2	0.4	0.5	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.3
	ni^{-} Negative net income	0.0	0.3	0.0	-0.3	-0.2	-0.6	-0.7	-1.0	-0.2	0.1	0.0	0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.0	-0.1	0.0	0.1	-0.1
	LEV Leverage	-1.9	-1.8	-1.5	-1.5	-0.9	-1.3	-1.7	-1.2	-1.1	-1.3	-1.1	-1.3	-0.6	-0.7	-1.0	-1.3	-1.6	-1.7	-1.3	-1.6	-1.6	-1.3	-1.6	-1.6	-1.6	-2.2	-1.4
	R^2 Goodness of fit	0.94	0.94	0.96	0.96	0.97	0.98	0.98	0.97	0.96	0.95	0.94	0.95	0.94	0.93	0.90	0.90	0.90	0.91	0.90	0.94	0.96	0.96	0.94	0.94	0.91	0.97	
Transportation	α_0 Intercept	1.5	2.0	1.6	1.6	1.8	1.6	1.6	1.2	1.0	1.4	2.1	2.4	1.4	1.9	2.0	1.5	1.6	2.6	2.4	1.9	2.1	2.4	2.4	2.1	2.2	1.9	1.9
	b Book equity	0.8	0.6	0.8	0.9	0.6	0.7	0.7	0.9	1.0	1.0	0.8	0.5	0.9	0.7	0.8	0.9	0.8	0.6	0.6	0.9	0.7	0.7	0.6	0.7	0.6	0.6	0.7
	ni^{abs} Absolute net income	0.2	0.4	0.2	0.1	0.5	0.3	0.2	0.1	0.0	0.0	0.2	0.6	0.1	0.3	0.2	0.2	0.2	0.3	0.3	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2
	ni^{-} Negative net income	0.3	0.1	0.1	0.0	-0.2	-0.2	0.0	0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.0	0.1	-0.1	0.0	-0.2	-0.1	-0.2	0.0	-0.2	-0.1	0.0
	LEV Leverage	-2.5	-2.4	-1.9	-2.0	-1.2	-1.3	-1.1	-1.0	-1.7	-1.8	-1.7	-1.2	-1.7	-1.4	-1.7	-1.6	-1.8	-2.2	-2.2	-2.4	-1.9	-2.0	-1.8	-1.4	-0.4	-0.6	-1.7
	R^2 Goodness of fit	0.96	0.97	0.97	0.97	0.94	0.95	0.92	0.95	0.97	0.96	0.94	0.95	0.95	0.94	0.94	0.95	0.93	0.89	0.89	0.92	0.87	0.90	0.92	0.92	0.89	0.92	
Wholesale	α_0 Intercept	1.7	1.8	1.6	1.5	1.8	1.3	1.5	1.8	1.3	2.9	2.2	2.2	1.9	1.9	1.9	2.0	2.1	2.4	2.5	2.7	2.5	2.5	2.5	2.7	2.5	2.6	2.1
	b Book equity	0.8	0.7	0.7	0.6	0.7	0.8	0.8	0.7	0.9	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.5	0.7	0.6	0.7	0.7	0.5	0.6	0.5	0.7
	ni^{abs} Absolute net income	0.1	0.3	0.3	0.4	0.3	0.2	0.3	0.4	0.2	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.4	0.3	0.2	0.4	0.3	0.4	0.3
	ni^{-} Negative net income	0.2	-0.1	-0.1	-0.1	-0.3	-0.2	0.0	-0.2	-0.1	-0.2	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1
	LEV Leverage	-2.1	-1.5	-1.5	-0.5	-1.2	-1.3	-1.3	-1.6	-2.2	-2.2	-2.3	-2.1	-1.7	-1.6	-1.8	-1.7	-2.2	-2.4	-2.7	-3.2	-3.1	-2.9	-2.8	-2.1	-2.2	-2.0	-2.0
	R^2 Goodness of fit	0.91	0.90	0.94	0.93	0.94	0.93	0.92	0.92	0.92	0.88	0.88	0.89	0.90	0.88	0.90	0.87	0.86	0.87	0.87	0.86	0.88	0.88	0.86	0.89	0.91	0.90	
Retail	α_0 Intercept	1.9	3.2	2.1	2.1	2.1	1.4	2.3	1.8	1.2	1.5	2.1	2.1	2.1	2.1	2.0	2.1	2.3	2.6	1.8	1.9	2.1	2.4	2.4	2.4	1.8	1.5	2.1
	b Book equity	0.8	0.3	0.7	0.7	0.7	0.9	0.5	0.7	0.9	0.9	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.8	0.8	0.7
	ni^{abs} Absolute net income	0.2	0.6	0.2	0.3	0.3	0.1	0.5	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.2	0.3
	ni^{-} Negative net income	0.0	-0.4	-0.7	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
	LEV Leverage	-2.5	-1.8	-1.9	-1.8	-1.7	-1.7	-1.2	-1.5	-1.9	-1.8	-2.2	-1.7	-1.7	-2.1	-1.8	-1.9	-2.8	-2.9	-2.8	-2.8	-2.1	-2.6	-2.0	-2.1	-1.5	-1.1	-2.0
	R^2 Goodness of fit	0.95	0.93	0.95	0.96	0.95	0.92	0.95	0.96	0.96	0.94	0.93	0.91	0.92	0.91	0.91	0.90	0.87	0.89	0.90	0.91	0.93	0.88	0.93	0.92	0.94	0.93	
Restaurants & Hotels	α_0 Intercept	2.6	2.2	2.4	2.9	1.0	1.0	1.4	1.7	1.3	2.2	2.8	2.8	2.0	2.8	2.5	1.8	1.8	2.6	1.8	2.0	1.9	2.7	2.9	2.6	1.9	2.3	2.2
	b Book equity	0.4	0.7	0.5	0.2	1.0	1.0	0.8	0.7	0.8	0.8	0.6	0.5	0.6	0.4	0.5	0.6	0.7	0.4	0.7	0.5	0.7	0.7	0.5	0.5	0.7	0.7	0.6
	ni^{abs} Absolute net income	0.5	0.2	0.4	0.7	0.1	0.0	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.5	0.5	0.4	0.3	0.5	0.4	0.6	0.3	0.3	0.5	0.5	0.3	0.3	0.4
	ni^{-} Negative net income	-0.5	-0.3	-0.1	-0.4	0.0	0.1	-0.1	-0.2	-0.2	-0.1	-0.2	0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.5	-0.2	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2
	LEV Leverage	-1.5	-1.5	-1.4	-1.0	-1.8	-2.1	-1.0	-1.3	-1.6	-2.5	-2.0	-2.2	-1.0	-1.3	-1.0	-0.8	-1.7	-1.8	-1.6	-1.4	-1.9	-3.1	-2.2	-1.6	-1.5	-1.2	-1.6
	R^2 Goodness of fit	0.97	0.95	0.96	0.94	0.96	0.96	0.96	0.94	0.96	0.94	0.90	0.92	0.89	0.83	0.85	0.91	0.89	0.88	0.90	0.92	0.90	0.83	0.91	0.91	0.94	0.92	
Other	α_0 Intercept	2.3	3.7	1.5	2.1	3.9	2.8	2.7	2.7	2.3	4.0	2.5	2.5	2.3	2.8	2.3	2.6	2.5	2.9	2.3	1.9	2.2	2.3	2.9	2.9	2.1	2.4	2.6
	b Book equity	0.7	0.0	0.9	0.7	-0.3	0.4	0.3	0.5	0.7	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.7	0.4	0.8	1.1	0.7	0.8	0.4	0.7	0.5	0.7	0.6
	ni^{abs} Absolute net income	0.3	0.9	0.1	0.3	1.1	0.6	0.7	0.4	0.2	0.3	0.4	0.4	0.5	0.3	0.4	0.4	0.3	0.6	0.4	0.0	0.3	0.1	0.5	0.3	0.6	0.5	0.4
	ni^{-} Negative net income	0.4	0.0	2.2	2.0	-1.9	-0.9	-0.3	0.2	-0.2	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.3	0.0
	LEV Leverage	-3.3	-2.5	-2.8	-2.0	-1.2	-2.4	-1.7	-2.0	-2.2	-2.7	-1.4	-1.3	-1.3	-2.0	-2.4	-2.2	-2.7	-2.3	-3.4	-3.9	-2.1	-2.6	-1.5	-2.9	-2.3	-3.6	-2.3
	R^2 Goodness of fit	0.99	0.97	0.99	0.94	0.95	0.97	0.96	0.88	0.91	0.88	0.89	0.90	0.91	0.79	0.90	0.89	0.87	0.85	0.80	0.83	0.82	0.81	0.72	0.80	0.90	0.90	